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REPORT

OF THE

COMMISSIONER OF PATENTS

FOR THE YEAR 1851.

PART I.

ARTS AND MANUFACTURES.

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1852.





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LETTER
OF
THE COMMISSIONER OF PATENTS,

IN RELATION

To Arts and Manufactures for the year 1851.

MARCH 16, 1852.—Read.

AUGUST 30, 1852.—Ordered to be printed, and that 17,000 additional copies be printed, 2,000 of which for the Commissioner of Patents.

UNITED STATES PATENT OFFICE,
March 13, 1852.

SIR: I have the honor of transmitting to you, with the view of its being laid before Congress, that portion of the Report of this Office for the year 1851 which relates to Arts and Manufactures. Its presentation has been delayed for the completion of a report on the World's Exposition, by Mr. Riddle, commissioner from the United States, which it was desirable to include.

The second or Agricultural section of the Report will shortly be submitted.

Very respectfully, your obedient servant,

THOMAS EWBANK.

HON. WILLIAM R. KING,

*Vice President of the United States,
and President of the Senate.*

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REPORT

OF THE

COMMISSIONER OF PATENTS.

I.

UNITED STATES PATENT OFFICE, *January, 1852.*

SIR: Before introducing the usual financial and statistical sections of the Report, I beg to submit some remarks and suggestions in relation to

THE PATENT OFFICE, ITS ADMINISTRATION, ETC.

1. *On the Supervision exercised by the Secretary of the Interior.*—There is in the business of the Patent Office nothing congenial with or allied to that which is transacted in the departments, while its very nature is such as to render exterior control often embarrassing. Whatever may have been expedient in the infancy of its organization, when it was little else than a clerkship under the Secretary of State, its position and requirements are very different now. To vest a controlling power over its administration in heads of departments who have no time to devote to it, and who, from education, habits, profession, and feelings, can have little or no active sympathies with interests represented in it, or with the class of citizens with whom it has most to do, can hardly prove otherwise than prejudicial. Hence there is an increasing desire among inventors and patentees, mechanics, manufacturers and others, whose feelings no less than their interests centre in the Patent Office, that its dependency on the department should cease.

On this subject I beg to quote from a communication addressed by me to the Secretary of the Interior on the 30th of January last:

“There is probably no question bearing more on the future usefulness and efficient administration of the Patent Office than the extent to which Congress designs it to be subject to any other department. Exclusively devoted to the progress of science and art, to the development of new elements of civilization, it should be protected in the prosecution of its mission, wholly freed from political influences; and it is believed that no administration can more readily command the approbation of reflect-

ing citizens, of all parties, than by securing to it this immunity. It was designed, as generally understood, by the law of 1836, to be an independent bureau, with a very limited check vested in the department. Such was the avowed intention of those who drew up the law, and such, as has been always understood in the office, was the intention of Congress, as manifested in instructing the Commissioner to report his proceedings directly to both Houses; in special legislation for his guidance; and, contrary to the practice in any other department or bureau, requiring from him bonds for the faithful performance of his duties, and for the disbursement of moneys from the Patent fund.

"A difference of views between the office and the department elicited the opinion of the Attorney General, that, 'The general supervision and direction over the Patent Office, which is vested in you, (the Secretary of the Interior,) comprehends the appointment of such temporary clerks in that office as are authorized by law; and also the payment of their salary or compensation out of any money appropriated for the purpose. And, of course, that the Commissioner of the Patent Office, in the employment or appointment of clerks, and in the disbursement of money appropriated for their compensation, acts under the superintendency and subject to the control of the Secretary of the Interior; and that it makes no difference in the case whether the money so to be disbursed is appropriated out of the agricultural fund, the Patent Office fees, or out of any other fund.'

"Since this opinion was communicated to me, it has been invariably respected; but as long as it is enforced, this bureau can never fully accomplish the objects for which it was organized. Whatever may be the practice in other bureaus, it will be impossible for any Commissioner to carry on, with credit to the country and satisfaction to inventors and patentees, the peculiar, important and multitudinous affairs, and to reconcile the often conflicting interests committed to his charge, if he be not permitted to judge of the merits and qualifications of his assistants, or to remove such as are incompetent, or in other respects unfit: that is, if he is made responsible for the acts of those over whom he has no control. And again: if the department has the control of the disbursements, it is but reasonable that the Secretary should file the required sureties, and not the Commissioner.

"On subjects deemed vital to the integrity and usefulness of the Patent Office, there should be left no room for doubt; hence, I respectfully recall these to your consideration, and propose to submit them to Congress, with a view of having the powers and responsibilities of the office distinctly defined."

The arts and sciences have no affinities with, and should not be linked to, temporary politics. To suppose the business of this office can be carried on, if its desks are occupied, as in some departments, by persons even of general qualifications, instead of special fitness, is a great mistake. Mechanical inventions and discoveries, for which patents are issued, are based upon the great physical laws of nature, and are illustrations of them; hence it is in conformity with those laws that the decisions of the office must be made. But this requires close and undivided attention, and, above all, freedom from extraneous interruptions and influences. These are, and ever must be, detrimental in the highest degree. They not only embarrass the proper and harmonious working

of the institution, but are subversive of the great objects contemplated in its organization.

The duties of the Commissioner and examiners are of too purely scientific a nature for them to be subjected, with advantage, to heads and sometimes chief clerks of departments, who cannot be expected to enter into the peculiar business of the Patent Office, or appreciate the very serious evils of interference. If the Commissioner and chief officers are not competent to perform, or are not faithful in the discharge of their onerous tasks, they should be removed; but if they are able and honest, they ought not to be harassed with calls to answer complaints preferred to the Department of the Interior, and often to the President, by disappointed applicants and their friends; by parties stimulated with promises of large sums, made payable on the issue of a patent; and by agents and speculators, smarting under the loss of such contingent fees. Nor is there the slightest ground or reason for such attempts at coercion; since, if the office improperly refuse a patent, the law has provided a court of appeal, in which its decisions can be revised and reversed.

Dissatisfaction on the part of applicants is unavoidable, because of the number of old devices presented for patents; nor can this ever be prevented, unless by the publication of such an Index of Inventions as has been in previous reports, and again in this, recommended to the favorable attention of Congress. There is no disposition in the office to refuse patents; the feeling is the very reverse. Rejections are made only in performance of a duty imposed by law. This duty is an unpleasant and arduous one, often blighting the fond anticipations of ingenious and worthy men, and often necessitating a more or less elaborate defence of the grounds of action in the case; whereas, in granting a patent the office is relieved from these and other difficulties. Hence it is absurd to suppose that refusals are wantonly made, there being no possible motive to refuse a patent, but every inducement to grant one. When doubts exist, the benefit is always given to the applicant.

If systematic endeavors to overawe and overrule the Commissioner be not frowned down, they will, in time, affect the integrity of the Patent Office, and will make it a source of injustice to the public and of grievous wrongs to real inventors. Its judicial character requires that it be cordially sustained, and jealously protected from improper influences. It should be surrounded with the same safeguards that defend the independence of every United States court. What would be the condition of judges of the Supreme and of other courts, if they were constantly called upon to reopen carefully adjudicated cases, and answer complaints of defeated litigants, accompanied with insinuations and often direct charges of ignorance, imbecility, partiality, corruption, and kindred attributes? Few high-minded men would accept and fewer would remain in office. In this bureau, everything is matter of record. No decision is made without communicating the reasons, in writing, to the parties concerned; they are placed on file, and become part of the public archives of the office. This, together with a court of appeal, secures the rights of applicants, and is an ample guarantee against unjust and arbitrary decisions.

It would, in my opinion, have been a dereliction of duty to have refrained from thus soliciting the attention of Congress to a subject so essentially affecting the character and usefulness of the Patent Office;

so deep are my convictions of the positively injurious effects of departmental control, unaccompanied, as it is, by one single compensating advantage to the office, the administration, or the public.

2. *Additional room required.*—I respectfully but earnestly urge an early provision of additional room for the clerical business of the office, as well as for a proper exhibition of the models. The continued occupancy of the largest and best part of the building as a museum, and the delay in finishing the new wing, have resulted in embarrassments that are daily becoming more and more serious. Indeed, if the evil be not soon corrected, it will prove a positive interruption to the business of the office. The few rooms at its command have become so crowded, that the mails have, for the last twelve months, been made up in the open passage, where the correspondence and daily cash remittances are unavoidably exposed.

Such an exhibition of the models as was contemplated and directed by the law of 1836 is not only impossible, but it is scarcely practicable to protect them from serious injury, if, indeed, the more delicate among them can be secured from positive destruction. Their condition is a great injustice to their authors, and to inventors and patentees generally; since the rooms and cases, prepared expressly for them at the expense of the Patent fund, have now been withheld from the office for a period of ten years. As Congress alone has the power, I would respectfully suggest that immediate action be taken to provide room necessary for the classification, arrangement, and proper display of the models.

In relation to the details of the subject, I beg to introduce the following correspondence, elicited by a resolution of the Senate, of January 28, 1851:

PATENT OFFICE, *January 30, 1851.*

SIR: Having been desired by you to express our opinion on the wants of this office, as far as room is concerned, we have the honor to report:

First. That the patented models now in the office are so much crowded that the provision of the law with respect to the exhibition of them cannot be complied with; that the rejected models are in a similar, but worse condition.

Second. That the draughtsman's room, library, and record-room, are at present crowded to an extent which renders it extremely difficult to perform the duties that are required to be done in those departments; at least three times the space is wanted for the library, and double for the draughtsman's room.

Third. It is a matter of almost absolute necessity that the recording clerks should be in the vicinity of the record-room.

Fourth. That the copying-clerk for letters and the clerk who has charge of assignments are at present crowded into apartments of other officers, whose rooms are too full without them.

Fifth. That it has become a matter of necessity for the examiners to have rooms in which they may converse with applicants, without the latter having an opportunity to examine, or even glance at, the models of pending applications.

Sixth. Rooms are required for workshops, caveat models, and pending models.

Seventh. That an ante-room has become indispensably necessary.

Eighth. That it is a matter well understood that the force of this office must be yearly increasing, and that the foregoing considerations are based upon the present force and the expected increase of records, but not upon an increased number of clerks.

We therefore believe that the whole of the basement of the present building and the wing are necessary for a proper distribution of the rejected models and for workshops; that the whole of the upper halls, both of the building and wing, are at present required for patented models, and will probably be filled to overflowing in the course of three years. And we also believe that the whole of the first floor of the present building and the wing will not more than suffice for the wants of the Commissioner, examiners, machinist, draughtsman, and clerks, when it is considered that the library and draughtsman's room are daily narrowing in effective space, and that it would be useless to move them into apartments which, in the course of less than three years, would be quite as contracted as those which are now daily hindering the effective action of this office.

If a different arrangement from that herein intimated be adopted, it will merely vary the distribution of offices, models, and records, but will not alter, in the least, the absolute amount of space that is needed.

All of which is respectfully submitted:

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SAML. P. BELL, *Machinist.*
S. T. SHUGERT, *Accounting Clerk.*
A. B. LITTLE, *Assignment Clerk.*

Hon. THOS. EWBank,
Commissioner of Patents.

UNITED STATES PATENT OFFICE, February 4, 1851.

In reply to your letter of January 31st, I have the honor to state that, with a view of ascertaining the sentiments of the principal officers of this bureau respecting the information called for by the resolution of the Senate of the 28th ultimo, viz: "What additional room, if any, is required for the proper accommodation of the Patent Office," &c., &c., I asked for their opinions, and thought it the safest course to submit them for your consideration in place of my own.

My personal opinion, now required, was, after an examination, expressed in the Report of 1849, page 512. Though the business of the office has increased since the date of that report, I still think that, were

the upper floor and its cases restored to the office for the reception of its models, and the space now occupied by the models converted into rooms, there would be sufficient for the immediate wants of the office.

If the museum is to remain where it is, then, certainly, the whole of the upper floor of the new wing will be required for the models now in the office; but that would be an inconvenient arrangement, since by it the models would be far distant from the rooms of the officers requiring them. It would be better to assign the new wing entirely to this office, or remove the museum into it. Under any circumstances the models, if they are to be properly disposed of and arranged for exhibition, as the law requires they should be, must be placed on the upper floor on account of light. When the west wing is completed, it is doubtful if there would be sufficient light to examine the objects in the cases were they to remain on the present or first floor. They are partially obscured now, and would then be much more so.

In conclusion, I have no hesitation in saying that, in view of the rapidly increasing business of the office, the present building will, in my opinion, be found wholly insufficient for the purposes of this bureau in three or four years, if not sooner. The papers accompanying your letter are herewith returned.

I have the honor to be, very respectfully, your obedient servant,
THOS. EWBank.

Hon. ALEX. H. H. STUART,
Secretary of the Interior.

The number of models at present in the office is nearly 20,000. The yearly accumulation exceeds 2,000; so that in ten years, the number cannot be estimated at less than 50,000, since the annual increase for the last four years has been between two and three hundred.

If the largest and best portion of the original building is still to be occupied with the collection of the Exploring Expedition, and if a moiety only of the new wing be accorded to this office, I submit that the \$211,000 withdrawn from the Patent fund, and expended on the wing, be returned; since, after the payment of that sum, the office will have no more room than what is admitted belonged to it before.

Were the Patent fund held sacred for the direct encouragement of science and art, and the interest expended in premiums for inventions and discoveries of national importance, (as suggested in the report of 1849,) it would be a fruitful and enduring source of honor and of benefits to the Union. I believe it of more importance to the country to preserve that fund intact, and to expend the interest as suggested, than to have a stately structure in which to transact the business of the office.

3. *Increase of clerical force.*—With the exception of two, authorized by the act of 1848, there have been no permanent clerks added to this office since its reorganization in 1836; while the duties of those employed have increased more than three fold during that period. They are, consequently, over-tasked, and inadequately paid. I would, therefore, respectfully and most earnestly ask Congress to authorize the employment of four additional permanent clerks, at salaries of \$1,200, to be assigned to such service as may be deemed necessary by the Commissioner for the despatch of the public business. Some of the duties for which these clerks are designed are now performed by persons employed

under the act of 1837. They are not qualified officers, but necessarily admitted to the secret archives, and other business requiring care and responsibility. These places, it is believed, should be filled by permanent clerks, sworn and qualified as such.

As examples of the necessity of permanent aid and increased compensation to certain branches of business, the duties of some of the officers whose desks are over-tasked are here referred to, by extracts taken from a report made by the Commissioner to the Secretary of the Interior, in September last, in obedience to a resolution of the Senate of the 7th of March, 1851, in relation to the classification of clerks, and "apportioning their salaries according to their services," with slight alterations, in which he recommended—

First. That the salary of the CHIEF CLERK of this bureau be increased to two thousand dollars per annum. This increase would only place the chief clerk of the Patent Office on an equality with those of other bureaus who receive a reasonable compensation, and who are exempt from the necessity of giving bonds, with surety, for faithful performance of duty, required by the chief clerk of this office.

Besides his heavy clerical and administrative duties, the entire business of the office passes through his hands, receiving its appropriate direction to the different branches. The duties thus devolving and accumulating upon him, rendered the services of an assistant necessary. This aid, supplied under the act of 1837, authorizing the employment of temporary clerks, is intended, also, to relieve other desks, and the clerkship should be made permanent.

Second. That the salary of the DRAUGHTSMAN, which is now twelve hundred, be raised to fifteen hundred dollars.

He has charge of the secret archives of the office; the drawings patented and rejected; pending files and evidence in cases of interference; receives applications from the chief clerk, entering them in books kept for that purpose, before they are distributed to the examiners; examines all drawings attached to patents before they go out of the office, and all copies of drawings made for courts or other purposes, besides attending to a large amount of miscellaneous business. It was found impossible, before the increase of the examining corps, for this officer to give his personal attention to these multifarious duties. Accordingly, an assistant was assigned to him under the act of 1837, whom I recommend to be made a permanent clerk.

Third. The MACHINIST. The duty of the machinist is to receive, classify, and arrange the models, to exhibit to inventors such classes as may be in the line of their discoveries; furnish the examiners with such as may be required in their examinations; keep records of those patented, suspended and rejected, and to conduct the correspondence relating to models, generally. The number of these interesting proofs of the inventive genius of the country has doubled within a few years, and now amounts to about 20,000. It has long been impossible for one person to meet the demands of this department. An assistant was necessarily appointed some years ago, and paid out of the contingent fund; and as the duties of the assistant are equally responsible with those of the machinist—he having a knowledge of models of pending applications and others belonging to the secret archives—he ought to be a sworn officer, and his place a permanent clerkship.

Fourth. That the salary of the ACCOUNTING OF DISBURSING CLERK be increased to \$1,500 per annum, and he be required to give bonds.

He has charge of the records of the office—the patented and withdrawn files; and is required to give information in relation thereto whenever called upon. He is also the accounting and disbursing clerk, and conducts the correspondence in relation to withdrawals; the discharge of which duties involves a heavy responsibility, and requires a person of not only reputable talents, but also of rigid integrity. Seventy or eighty thousand dollars passes through his hands annually, and yet for a salary of \$1,200 he assumes all the responsibility of such a trust.

Fifth. That the salary of the ASSIGNMENT CLERK, who now receives \$1,000, be increased to \$1,200. When this salary was authorized, the amount was, in a measure, commensurate with the duties performed; but, owing to several changes in the business and *personnel* of the office, many very important matters have been transferred from other desks to his, making it a very responsible and laborious position. He is charged with the preparation of all certificates for copies of records, files, &c., conducts the correspondence respecting copies, transfers of patent rights, and miscellaneous inquiries, and receives and accounts for the fees paid for copies and for recording deeds. In miscellaneous correspondence, which pertains to his desk, questions often arise involving preliminary legal points, requiring a competent knowledge of the patent law, as well as a thorough acquaintance with the practice of the office.

4. *Librarian.*—The library is an indispensable element in transacting the business of the office; and it is essential that it keep pace with the advancement of science and the arts, abroad as well as at home. As its importance and contents daily increase, it is desirable that a salary be attached to the librarianship commensurate with the services required; one sufficient to engage a person whose habits, education, and tastes, fit him for the position. Besides cataloguing, collating, and indexing the books, he might keep a digest of patents as they are issued, and post up materials for and aid the Commissioner in the preparation of the annual report. He should understand the German and French languages. I would recommend that the salary be made permanent, and not less than \$1,200.

5. *Patent laws.*—It is believed that a registry law might be beneficially substituted for the law relating to designs. It would be more comprehensive, and better calculated to secure the objects sought, than the law at present in force.

I would recommend that in all cases where a patent is granted, upon proof that the applicant invented it prior to the issue of a patent granted before the application, or prior to a publication of the same invention made before said application, or prior to the use of the same by others before the filing of said application, said patent shall take the date of the earliest patent, the earliest publication, or the earliest use of said invention.

I would also recommend that, for the purpose of diminishing litigation, a system of cumulative damages and cumulative costs be authorized, depending upon the number of times a patent has been affirmed or invalidated before a court of competent jurisdiction. It is believed that such a system will, to a great extent, prevent calling the validity of patents in question for mere purposes of vexation, and will also check

the bringing of suits upon invalid patents for the purpose of procuring unjust tribute through fear of litigation. No plan has occurred to me which I consider so well calculated to check unnecessary and vexatious litigation under patents.

6. *Judge of appeals.*—The infirm health of the venerable chief justice of the District of Columbia, renders it necessary for Congress to make early provision for giving appellate jurisdiction over the decisions of the office.

In submitting the following letter from the chief justice, I feel it my duty again to call the attention of Congress to the total inadequacy of the compensation allowed by the act of 1827 for the services therein prescribed.

My immediate predecessor, in the report of 1847, uses the following language in reference to this office: "From that time (March 3, 1837) down to the present, many appeals have been taken from the decisions of the Commissioner and decided by the chief justice, who has sustained his decisions by able and elaborate opinions, involving important principles of patent law." These opinions were published by Congress; they constitute the most valuable body of decisions on our present patent laws; are respected as authority in all our courts; and evince the high integrity, profound learning, and great industry of their author.

For these labors his only pecuniary compensation was \$100 per annum; whereas single cases have occurred wherein a larger sum would have been inadequate. I respectfully suggest that an additional sum be allowed Judge Cranch out of the patent fund, as an acknowledgment of the important services he has rendered to this office.

Letter of Judge Cranch.

WASHINGTON, D. C., *December 15, 1851.*

DEAR SIR: I am unable, by reason of great age, sickness, and infirmity, to discharge the duties imposed upon me by the patent laws of the United States.

I have, therefore, petitioned Congress to repeal such parts of those laws as require me to hear and determine appeals from the decisions of the Commissioner of Patents.

My memorial is, I believe, referred by the Senate to the Committee on the Judiciary.

I suppose some substitute will be required for the provisions which may be repealed.

With great respect, I am, dear sir, your obedient servant,
W. CRANCH.

Hon. THOMAS EW BANK,
Commissioner of Patents.

7. *Analytical and descriptive Index of Inventions.*—Respecting this great desideratum, I beg to refer to my Report for 1849, page 516; to repeat the recommendations and to urge the appropriation therein named, for the commencement of such a compilation. Its importance, utility and necessity are becoming more and more apparent. No state paper and no mere human volume can ever surpass it in immediate and endur-

ing value. A greater boon to inventors, to science, and to the world at large, could hardly be named. It would be consulted as long as the arts are cherished, and would rather increase than diminish in interest as time rolls on.

If the cost of printing it be deemed an objection, a fair manuscript copy would be of great value to the examiners, and above all price to inventors and others, who should have access to it in person, or through their agents.

8. *Chemical apparatus for the use of the office.*—In the chemical branch of the examining department the furniture of a small laboratory is much needed, to enable the examiner to verify or disprove alleged ingredients and results of applicants for patents for materials, processes and compounds. Section sixth of the act of 1836 provides that every applicant for a chemical patent shall accompany his application “with specimens of ingredients and of the composition of matter, sufficient in quantity for the purpose of experiment.” Hitherto no means of testing such specimens have been provided, although obviously within the meaning of the law. The increasing number of applications belonging to this class and their alleged importance render it highly desirable, and indeed indispensable, that the examiner should have at hand the means of arriving at correct and definite decisions. It is therefore proposed to have a room fitted up as a laboratory, and that the Commissioner be authorized to procure the requisite apparatus, at an expense not exceeding \$800.

9. *Reports of the office illustrated.*—It is very desirable that these documents should be rendered more practically useful to inventors, and to others interested in the progress of the arts. They are essentially defective in descriptions of devices patented, such descriptions being confined to the claims, the full meaning of which can seldom be understood for want of details and drawings. To publish the specifications in *extenso* would swell the annual exposition into several large volumes; but if simple and neat engraved illustrations were introduced along with the claims, a moderate addition only would be made to the volume now devoted to inventions. Let a small but clear outline engraving be given of each-patented invention—that is, of the peculiar portion covered by the claim—and every person consulting the reports would understand the precise nature of the inventions at once, and consequently be prevented from repeating them. As long, therefore, as the specifications and drawings are not published in full, it would be a decided improvement, and in a majority of cases all that is wanted to convey a correct idea of the devices patented, to accompany each “claim” with a neat and lucid wood-cut illustration. Nearly every inventor would be glad to supply one, and few would object to a provision made by law, requiring one, or an electrotype cast of one, to be furnished by each patentee. They might be, and in general ought to be, confined to the features patented, so that seldom more than half a page would be taken up, while in a majority of cases one-third of a page, or even less, would suffice.

The insertion of such illustrations would make the reports much more popular and useful. They would impart greatly increased and more definite information and would save many an inventor an inconvenient outlay of time and money in travelling to Washington to examine the models in the Patent Office. The reports would be more care-

fully preserved, both in public and private libraries, and more frequently consulted by inventors and others.

As regards the style or workmanship in which the office reports are got up, I beg to suggest that a much smaller number than what is usually printed would be preferable, in nearly every point of view, provided they were issued in respectable and enduring volumes. As permanent records, *ten thousand* copies, got up in a style creditable to the office and to the country, would be more valuable and do more service than ten times the number of the usual character. Instead of being rapidly consumed as waste-paper, they would be preserved in both private and public libraries. A complete set is not now to be had; and it is doubtful if a dozen sets are in existence; (there are none in the office of a date prior to 1845) This is believed to be chiefly, if not wholly, due to the inferior quality of the paper and printing—to the unattractive and unsubstantial dress in which they have been sent forth.

If inventions are fraught with consequences of the highest import to the well-being of society and honorable to the people that originate them, descriptions of them are worthy of preservation; and the more so since every new application of science and every addition to art has a lasting value. Tomes of the early printers are extant, and their pages appear fresh as when struck off, promising to outlive most of modern works. Few, if any, of our Patent Office reports will be found on book-shelves four centuries hence—their materials will have perished,* while there is no room to doubt that thousands of volumes printed in the fifteenth century will be consulted in the twenty-fifth. The annual reports of a bureau so intimately allied with mechanical progress as this is, ought, in some degree, to correspond with the present state of the arts connected with book making. Our ministers abroad have often felt ashamed when comparing some of our documents with those of foreign governments. Of the 500 copies of the Report of 1849, Part 1, which the Senate authorized the undersigned to have printed, at a cost not exceeding fifty-five cents each, some were forwarded to American embassies abroad. The secretary of the legation at London, in acknowledging the receipt of a parcel, expressed his gratification at being furnished with a national document which he could exhibit without blushing.

It is the practice in nearly every public library to have its volumes bound in one uniform style; but with bound Patent Office reports this could not be done without cutting away the text, in consequence of the small portion of margin left by official binders; hence unbound are often preferred to bound copies. As the public binding is not calculated to be durable, it would be a decided improvement if the margin left by the binders were required to be not less than five-eighths or three-quarters of an inch in width.

10. *International exchanges.*—It is proper, in this place, to acknowledge the obligations of the office to M. Alexandre Vattemare, the well known founder of the system of international exchanges, for valuable contributions to its library, and for collections of foreign seeds.

The "*Annales des Ponts et Chaussées*," a journal containing the transactions of the corps of topographical engineers in France, and

* A large edition of an English classic disappeared in thirty years, from the corroding action of chlorine used in bleaching the paper.

"*Annales des Mines*," a journal devoted to mining and metallurgic operations, have been received from him entire; also, the continuation, for several years past, of the "*Brevets d'Invention*," containing descriptions of patents granted in France, together with various works upon agriculture, chemistry, &c., received, through his agency, from individuals and scientific societies in France.

A series of specimens of Algerian soils and products, prepared by order of the Secretary of War of France, together with a collection of the agricultural productions of France, prepared by Mons. A. Vilmorin at the request of the Central Agricultural Society, have been received through Mons. Vattermare; but as it was understood that they were intended for the Department of the Interior, they have been handed over to the Secretary of that department, who has made mention of them in his late report accompanying the message of the President to Congress.

11. *Examiners' reports.*—These have been omitted, partly on account of the pressure of business on the examiners' desks, but principally because complaints have been made of partiality in the selections of inventions noticed. To avoid this, all must be mentioned or none. These reports necessarily made invidious distinctions in regard to the relative importance and merits of devices patented. Such distinctions doubtless exist, but the duty of pointing them out does not attach to this office. They have been a fruitful source of complaint, of charges of partiality, and even of corruption; and although such charges are to be expected under any circumstances, it is inexpedient for the office to travel out of its path to invite them.

II.

FINANCIAL AND STATISTICAL.

The number of applications for patents received during the year ending December 31, 1851, is two thousand two hundred and fifty-eight; the number of caveats filed during the same period is seven hundred and sixty; being an increase of applications over last year of sixty-five, and of caveats one hundred and fifty-eight.

The number of patents issued during the year 1851 is eight hundred and sixty-nine, including twenty-five re-issues, three additional improvements, and ninety designs. Three disclaimers were entered during the year.

Within the year 1851, four hundred and thirty-eight patents have expired, a list of which is annexed, marked H. There were fifteen applications made during the year to extend patents, the terms of which were about to expire; which, with five pending applications at the close of last year, made twenty cases to be considered. Of these, nine were granted and eleven rejected. None have been extended by Congress during the year.

The receipts of the office for the year 1851, on account of applications for patents, caveats, additional improvements, re issues, extensions, recording assignments, powers of attorney, &c., and for copies, amount to \$95,738 61, as per statement marked A; being an increase over the receipts of last year of \$8,811 56.

The expenses of the office for the year 1851 are as follows, viz: For salaries, \$33,719 73; contingent expenses, \$11,533 81; books for the library, \$1,183 32; temporary clerks, \$14,391 12; agricultural statistics, \$4,937 84; refunding money paid by mistake, \$186 77; compensation of librarian, \$250; chief justice of the District of Columbia sitting on appeals from Commissioner of Patents, \$100; on applications withdrawn, \$20,614 34, as per statement marked B; leaving a balance to be carried to the credit of the Patent fund of \$8,821 68, as per statement marked C.

On the 1st day of January, 1851, the amount of money in the treasury to the credit of the Patent fund was \$15,331 27; to which add the excess of receipts over expenditures for the year, \$8,821 68, leaves a balance in the treasury to the credit of the Patent fund, on the 1st day of January, 1852, of \$24,152 95, as per statement D.

There were one hundred and sixty-nine cases on the examiners' desks on the 1st of January, 1851; the number of applications received during the year, two thousand two hundred and fifty-eight; making the whole number of applications before the office during the year two thousand four hundred and twenty-seven. Of this number, one hundred and fifty-five remained unexamined on the 1st day of January, 1852.

The business of the office for the past year shows the examination of two thousand two hundred and seventy-two applications, resulting in the issue of eight hundred and sixty-nine patents and one thousand four hundred and three rejections and suspensions, as exhibited per statement E.

A statement is also appended, showing the amount of fees received, applications and caveats filed, during each month of the year, marked F^r.

A.

Statement of receipts for patents, caveats, additional improvements, recording assignments, &c., and for copies.

Amount received for patents, caveats, re-issues, and additional improvements.....	\$89,022 00
Amount received for recording assignments, &c., and for copies.....	6,716 61
Total.....	<u>95,738 61</u>

B.

Statement of expenditures and payments made from the Patent Fund by the Commissioner of Patents, from January 1, 1851, to January 1, 1852, under the acts of Congress making provision for the expenses of the Patent Office, viz:

For salaries.....	\$33,719 73
For contingent expenses.....	11,533 81
For books for library.....	1,183 32
For temporary clerks.....	14,391 12
For refunding money paid by mistake.....	186 77
For withdrawals.....	20,614 34
For compensation of librarian.....	250 00
For compensation of district judge.....	100 00
For collecting agricultural statistics, viz:	
Salary paid agricultural clerk (\$500 due for 1850). \$2,500 00	
Salary paid assistant, Mr. Fogg.....	222 15
Amount paid for copying report.....	501 69
Amount paid for seeds, stationery, &c.....	1,714 01
	<u>4,937 85</u>
	<u>86,916 94</u>

In the above sum of \$86,916 94, which shows an increased expenditure for the year 1851 over that of 1850 and former years, is embraced—
The salaries of two principal and two assistant examiners, authorized at the last session of Congress, at the rate of \$8,000 per annum for nine months.....\$6,000 00
The excess of expenditure for the agricultural desk over last year.....1,078 49

Besides these extraordinary expenditures, the withdrawals of applications have been unusually large, exceeding the amount of those of last year—which was greater than any preceding year—the sum of.....\$2,601 01

9,679 50

This sum of \$9,679 50 deducted from the whole expenditure, \$86,916 93, and the ordinary expenses of the office for the year 1851 is shown to be only \$77,237 43—\$2,863 52 less as compared with the expenses of last year.

—

C.

Statement of receipts and expenditures of the Patent Office for the year 1851.

Amount received from all sources.....\$95,738 61
 Amount of expenditures of all kinds.....86,916 93

Amount carried to credit of Patent fund for 1851.....8,821 68

—

D.

Patent Fund, January 1, 1851.

Amount of fund January 1, 1851.....\$15,331 27
 Amount carried to Patent fund for 1851.....8,221 68

Amount remaining in the treasury to the credit of the
 Patent fund January 1, 1852.....24,152 95

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E.

Statement of applications on hand January 1, 1851, and number received during the year and acted upon.

Number of cases on examiners' desks January 1, 1851.....169
 Number of applications received in 1851.....2,258

Number of cases before the office during the year.....2,427
 Number of patents issued during the year.....869
 Number of applications remaining unexamined.....155
 Number of rejections and suspensions.....1,403

2,427

F.

Statement showing amount of fees received and number of applications and caveats filed during each month of the year 1851.

Months.	Cash received.	Certificates received.	Small fees received.	Total received.	Applications filed.	Caveats filed.
January.....	\$2,860 00	\$3,845 00	\$477 97	\$7,182 97	183	78
February.....	4,095 00	5,340 00	549 06	9,984 06	211	93
March.....	3,650 00	5,150 00	952 45	9,782 45	237	72
April.....	3,195 00	4,031 00	531 92	7,747 92	184	73
May.....	3,669 00	4,865 00	419 78	8,953 78	218	52
June.....	3,487 00	5,475 00	635 59	9,579 59	187	50
July.....	3,310 00	2,725 00	524 44	6,559 44	178	61
August.....	2,745 00	2,810 00	358 37	5,913 37	141	52
September.....	4,400 00	3,110 00	669 15	8,179 15	229	55
October.....	4,225 00	2,955 00	401 30	7,581 30	150	64
November.....	4,465 00	2,855 00	428 73	7,748 73	171	49
December.....	2,725 00	3,045 00	737 85	6,507 85	169	61
Total.....	42,826 00	46,196 00	6,716 61	95,738 61	2,258	760

Table exhibiting the business of the office for the last eleven years, and the necessity of an increase of permanent clerical force.

Years.	Applications filed.	Caveats filed.	Patents issued.	Amount of cash received.	Amount of cash expended.
1841.....	847	312	495	\$40,413 01	\$23,065 87
1842.....	761	291	517	36,505 68	31,241 48
1843.....	819	315	531	35,315 81	30,776 96
1844.....	1,045	380	502	42,599 26	36,344 73
1845.....	1,216	452	502	51,076 14	39,395 65
1846.....	1,272	448	619	50,264 16	46,158 71
1847.....	1,531	533	572	63,111 19	41,878 35
1848.....	1,623	607	660	67,576 69	58,905 84
1849.....	1,955	595	1,076	80,752 78	77,716 44
1850.....	2,193	602	995	86,927 05	80,100 95
1851.....	2,258	760	869	95,738 61	86,916 93

The foregoing statistics exhibit a very large increase of business in this office for the last eleven years; and by reference to the table it will be seen that the increase for 1851 is in full proportion with former years. This accumulation of business has been provided for from time to time by Congress, in authorizing necessary additions to the examining force. This force for the present is deemed sufficient. But there are still departments of the business and labor of the office which have increased in a corresponding ratio with the examinations, and no provision made by Congress to relieve them. Hence the suggestions in relation to an increase of clerical force, in the preceding pages.

IV.

CLASSIFIED LIST OF PATENTS THAT HAVE EXPIRED IN THE YEAR 1851.

CLASS I.—*Agriculture, including instruments and operations.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Corn husking.....	Jonathan Cutler.....	Putney, Vt.....	July 31
Cultivator for thinning cotton plants	John Weaver.....	Washington, D. C...	July 5
Cutting cradle for hemp.....	Wilson L. Larimore...	Paris, Ky.....	April 25
Cutting scythe snath.....	Dexter Pierce.....	Montague, Mass....	Mar. 11
Hulling clover seed.....	William M. Barton...	Clark's Cross Roads, Tenn.	Dec. 20
Hulling rice.....	C. H. Harvey and E. Tracy.	Poughkeepsie, N. Y.	May 30
Lime spreading.....	Francis H. Smith.....	Baltimore, Md.....	July 5
Lime spreading and sowing.....	Levi Rice.....	Chester, Pa.....	Aug. 31
Plough.....	Bancroft Woodcock...	Mount Pleasant, Pa..	June 14
Plough.....	Sam. Harpence and John D. Bowne.	Kingwood, N. J.....	July 5
Plough.....	John C. Smith.....	Kingwood, N. J.....	July 11
Plough.....	John B. Norton.....	Philadelphia, Pa....	July 17
Plough.....	Isaac Snider.....	Mount Pleasant, Pa..	July 17
Plough.....	Stephen McCormick...	Auburn, Pa.....	Dec. 1
Rake, horse.....	David Dewey.....	Poultney, Vt.....	Nov. 23
Rake, revolving.....	Stephen Coats.....	Shoreham, Vt.....	April 17
Smut machine, (antedated August 1, 1837.)	Benjamin M. Smith...	Rochester, N. Y.....	Sep. 8
Smut machine.....	Charles D. Childs.....	Mount Morris, N. Y.	Aug. 15
Smut machine, for garlic.....	Henry Staub.....	Shepherdstown, Va..	Nov. 11
Strainers for milk-pails.....	Isaiah Burmel.....	Derby, Ct.....	Aug. 18
Straw cutting.....	Henry Silliman.....	Perry village, N. Y...	Mar. 30
Threshing and hulling clover seed..	Jonathan Brooks.....	Brownburg, Va.....	Dec. 15
Threshing machine.....	Alexander W. Bowling	Front Royal, Va.....	Dec. 26
Threshing and winnowing.....	Moses Davenport.....	Phillips, Mass.....	Nov. 23
Threshing and winnowing, (ante- dated June 29.)	J. A. & Hiram A. Pitts.	Winthrop, Maine....	Dec. 29
Winnowing, separating, &c., wild peas from grain.	Lester Butler.....	Coble's hill, N. Y..	June 3
Yoke, horse and oxen.....	Gideon Hotchkiss.....	Windsor, N. Y.....	Aug. 31

CLASS II.—*Metallurgy and manufacture of metals.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Blow pipe for blast furnaces.....	John Barker.....	Baltimore, Md.....	Mar. 3
Door plates.....	William C. Austin.....	Greensville, Va.....	Jan. 31
Door springs.....	Thomas Thorpe.....	West Cambridge, Mass.	Dec. 7
Door, springs for shutting.....	Ithiel S. Richardson...	Boston, Mass.....	Oct. 20
Fire proof safe.....	Benjamin Sherwood...	New York.....	May 8
Fire proof safe.....	Daniel Fitzgerald.....	Mount Morris, N. Y.	Aug. 15
Furnace blast.....	John Barker.....	Baltimore, Md.....	April 20
Furnace for shear steel, &c.....	Simeon Broadmeadow..	New York.....	April 5
Furnace, smelting ore.....	George E. Sellers.....	Philadelphia, Pa....	April 20
Furnace, smelting ore.....	Simeon Broadmeadow..	New York.....	April 5
Hinges or butts, double-centred joints	Egbert Hedge.....	Hartford, Conn.....	Nov. 23

IV.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Iron, carbonating and smelting.....	Asa Whitney.....	Southfield, N. Y.....	July 17
Iron ore, smelting.....	Joseph Lyon.....	Pottsville, Pa.....	July 31
Iron, &c., washing ores.....	Frederick Fredly.....	Logan Township, Pa.....	April 20
Joints for rules, double-centred...	Lemuel Hedge.....	Hartford, Conn.....	April 29
Knobs, door, drawer, commode, &c.	David Holman.....	Baltimore, Md.....	July 31
Knobs, glass, to metallic sockets, attaching.	Enoch Robinson & G. W. Robinson.	Boston, Mass.....	Oct. 20
Latch mortise.....	Charles S. Gay.....	Nashua, N. H.....	Sep. 28
Latch mortise.....	David N. Ropes.....	Portland, Maine.....	Sep. 28
Lock, door.....	Turner Whitehouse...	Boston, Mass.....	Sep. 8
Lock, door.....	James McClony.....	New York.....	June 14
Locks, mail-bag and clasp.....	Henry C. Jones.....	Newark, N. J.....	Oct. 23
Locks, secret safety.....	William Hobbs.....	Springfield, Mass....	Dec. 20
Nails and brad cutting.....	Joseph Barry & Oliver P. Rand.	Newmarket, N. H....	Mar. 20
Nails, wrought.....	N. W. Bishop & Simon Brooks.	Saybrook and Chester, Conn.	Sep. 21
Rivets, making.....	Levi Severance.....	Pittsburg, Pa.....	July 11
Screws, cutting.....	Joseph Blackall.....	Albany, N. Y.....	July 29
Screws, cutting, of screw bedsteads.	Palmer Williams.....	Towanda, Pa.....	Feb. 16
Screws, cutting wood.....	Jacob Sloat & Thomas Springstead.	Ramapo and Poughkeepsie, N. Y.	Mar. 30
Screw, wood, turning heads.....	Thomas W. Harvey...	Poughkeepsie, N. Y..	Mar. 25
Screw, wood.....	Clement O. Reed.....	Providence, R. I.....	Dec. 15
Shoes, horse.....	Barzillai Young & Sam. Titus.	Brooklyn, Conn.....	July 29
Vice, bench, &c.....	Linus Dean.....	Utica, N. Y.....	Feb. 16
Window blinds, fastener.....	Elijah Jaquith.....	Brattleborough, Vt..	Dec. 26
Window fastening, combined spring.	Philip F. Hazard.....	Philadelphia, Pa.....	July 11
Window sash, spring for upper sash.	Henry Hammond.....	Lewisburg, Pa.....	Sep. 8
Wire, cutting and heading.....	Thomas W. Harvey...	Poughkeepsie, N. Y..	Mar. 25

CLASS III.—*Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Flax and hemp-breaking.....	John Warren.....	Westbrook, Me.....	June 14
Flax and hemp-breaking.....	Harvey Lull.....	Ithaca, N. Y.....	June 14
Flax and hemp-breaking and cleaning.	David M. Langley and Samuel Davis.	Westbrook, Me.....	Sept. 21
Flax and hemp-breaking and dressing.	Chapin Warner, Abraham F. Mixwell, and Edwin J. Horn.	Belvidere, N. J.....	July 31
Flax and hemp-dressing.....	William and Robert Britain.	Armwell, N. J.....	Oct. 12
Fur-cutting from skins.....	Samuel Johnson.....	Walnut Lane, N. C.	Feb. 24
Gin, cotton.....	Alexander Jones.....	New Orleans, La.....	April 25
Gin, cotton.....	John Stevens.....	Poughkeepsie, N. Y.	Nov. 25
Gin, cotton.....	Lucillius H. Mosely...	Poughkeepsie, N. Y.	Nov. 25
Gin, cotton, saw-cylinder for.....	Jacob Elder.....	Philadelphia, Pa....	Dec. 1
Hair-seating, weaving.....	Charles R. Harvey....	Poughkeepsie, N. Y.	Nov. 25
Hat bodies.....	Hugh Moore.....	New York city.....	April 20

IV.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Hat bodies... ..	Henry A. Wells, J. James, and R. W. Peck.	Brooklyn, N. Y.	1837. April 20
Hat bodies, batting or web for....	Phineas Blanchard....	New York city.....	June 14
Hat bodies, batting or web for....	Henry A. Wells and Robert W. Peck.	Brooklyn, N. Y.	Sept. 22
Hemp-hatcheling	Phineas G. Rice and Gabriel Rice.	Danville, Ky.	July 11
Knitting machine.....	John McMullin and Joseph Hallen, jr.	Sinking Valley and Logan's Valley, Pa.	Feb. 11
Loom, (ante dated March 21, 1837).	Christian W. Schauberr.	Subject of the King of Saxony.	May 8
Loom, (ante dated Feb. 10, 1837)..	Enoch Burt.....	Manchester, Conn...	Aug. 8
Loom-power, figure.....	William Compton....	Taunton, Mass.	Nov. 25
Loom, regulating yarn beam.....	Welcome A. Potter....	Cranston, R. I.	Nov. 23
Loom shuttle-tongue.....	Comfort B. Thorpe....	Smithfield, R. I.	April 17
Loom temple, self-adjusting.....	Samuel P. Mason.....	Newport, R. I.	July 22
Loom treadles and harness.....	B. Harford and W. B. Tilton.	Enfield, N. H.	Dec. 29
Napping cloth.....	Benjamin Swazy.....	Mt. Vernon, Vt....	Aug. 8
Oil-cloth, drying.....	Daniel Sampson.....	Winthrop, Me.	May 30
Paper sizing.....	John Ames.....	Springfield, Mass....	Dec. 1
Spinning woollen roving.....	Edgar M. Titcomb....	Andover, Mass.....	July 29
Thread, preventing from waste, &c.	John Golding.....	Dedham, Mass.....	Aug. 15
Thread, waste, reducing to cotton-wool.	Ogden Griswold.....	Hartford, Conn.....	July 17
Thread, waste, reducing to cotton-wool.	William Gray.....	Connecticut.....	July 29
Wool, cleaning.....	J. Wolcott and C. W. Brown.	Roxbury, Mass.....	Oct. 18
Wool, cleaning burr from.....	Erastus Tracy.....	Poughkeepsie, N. Y..	Dec. 20

CLASS IV.—*Chemical processes, manufactures, and compounds, including medicine, dying, color-making, distilling, soap and candle-making, mortars, cements, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bitterings from kettles, process of separating.	David Dear.....	Salina, N. Y.	1837. Oct. 18
Candle-moulding.....	J. Moore and S. P. Bower.	Strasburg, Pa.	Mar. 3
Candle-moulding.....	Joseph H. Tuck.....	Nantucket, Mass....	July 11
Caoutchouc, divesting of its adhesive properties.	Charles Goodyear....	New York	June 17
Cement for cisterns.....	Thomas Coyle.....	Baltimore, Md.	Aug. 16
Cement, hydraulic, from basanite..	Ebenezer C. Warner..	Albany, N. Y.	Oct. 6
Coloring-matter, manufacture of...	Henry Stevens.....	G. Britain, England .	Oct. 28
Composition matter for fire-brick, &c.	Christ'phr W. Fenton.	Bennington, Vt.	Sept. 22
Composition, protecting metallic sheathing of vessels.	Edward M. Robinson..	New Bedford.....	Aug. 8
Composition, water-proof, for boots, &c.	Patrick G. Nagle.....	Philadelphia, Pa.	Feb. 1

IV.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Gum senegal, substitute for, (antedated May 30, 1837.)	Walter Leveridge	Dorchester, Mass....	Aug. 8
India rubber, manufacture of.....	Stephen C. Smith.....	New York.....	Dec. 7
Leaching ashes.....	Garret Clements.....	Canandaigua, N. Y..	June 10
Lead, carbonate of.....	Charles Ripley.....	Saugerties, N. Y....	July 11
Lead, white.....	Peregrine Phillips....	Campbell co., Ky....	April 17
Matches, loco-foco, dipping.....	John Hatfield.....	Stillwater, N. Y....	June 3
Medicine, worm-destroying.....	John J. Oellig.....	Waynesborough, Pa.	Oct. 28
Oleagenous seeds, preparing for pressing.	James Creswell.....	Pittsburg, Pa.....	July 31
Paint, composition.....	William Cox.....	Dayton, Ohio.....	Oct. 23
Paint, protection of buildings.....	Louis Painboeuf.....	Washington, D. C..	Nov. 11
Paint, white, water-color.....	Forrest Sheppard....	New Haven, Conn....	July 17
Pills, tonic and aperient.....	John J. Oellig.....	Waynesborough, Pa.	Oct. 28
Plaster, adhesive, spreading.....	B. Morison.....	Milton, Pa.....	Aug. 8
Preserving iron from rust.....	M. Sorel.....	Paris, France.....	Dec. 7
Preserving timber and other vegetable products.	John Knowles & Robt. Gilbert, executors of Robert Bill.	London, Eng., and New York city.	Sept. 21
Preserving timber from worms.....	August Gotthilff.....	New York.....	June 14
Salt water, purifying.....	Nils Sholtewski Von Saultz.	Salina, N. Y.....	July 29
Soap, making.....	Daniel E. Stillwell....	Utica, N. Y.....	July 17
Sugar, manufacturing.....	John Penny.....	Parish Ascension, La.	Sept. 25

CLASS V.—*Calorific, comprising lamps, fireplaces, stoves, grates, furnaces for heating buildings, cooking apparatus, preparations of fuel, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Air to wood and coal stoves, (antedated March 25, 1837.)	Federick A. Frickhardt.	Easton, Pa.....	Sept. 25
Cooking apparatus.....	William W. Parrott...	Boston, Mass.....	Mar. 11
Cooking, fire apparatus for.....	Daniel Stephens.....	Kitland, O.....	Oct. 18
Cooking, generating steam for.....	John Bovis.....	Baltimore, Md.....	Sept. 21
Cooking, steam vessel for.....	John Morris.....	Derby, Conn.....	Oct. 28
Cooking stove.....	Benjamin H. Wood...	Bath, Steuben co., New York.	Jan. 31
Cooking stove.....	Abraham T. Mixell...	Belvidere, N. Y....	July 19
Cooking stove.....	Edwin Reed.....	West Bridgewater, Massachusetts.	July 29
Cooking stove.....	John Richardson.....	Paultney, Vt.....	July 29
Cooking stove.....	Samuel Utter.....	New York city.....	Aug. 8
Cooking stove.....	James Wilson.....	New York city.....	Aug. 15
Cooking stove.....	John S. Leavitt.....	Turner, Me.....	Aug. 31
Cooking stove.....	Elijah Skinner.....	Sandwich, N. H....	Oct. 18
Cooking stove.....	James N. Olney.....	New York city.....	Nov. 20
Cooking stove.....	David Hastings & Solomon Sikes.	Deerfield, Mass....	Nov. 23
Cooking stove.....	Nathaniel Walker.....	Dighton, Mass.....	Dec. 1
Cooking stove.....	Jonathan G. Hathaway.	Painesville, O.....	Dec. 7
Cooking stove.....	Jesse Hutchinson, jr..	Lynn, Mass.....	Dec. 20
Cooking stove.....	Carrington Wilson, jr..	New York city.....	Dec. 29
Cooking stove, coal.....	William Kenney.....	Louisville, Ky.....	July 29
Cooking stove, combination.....	Jordan L. Mott.....	New York city.....	Nov. 20
Cooking stove and galley.....	Benjamin Spratley....	Portsmouth, Va.....	Sept. 25

IV.—*Classified list of patents, &c.—Continued.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Cooking stove and galley	James Barron.....	Philadelphia, Pa....	Oct. 6
Cooking stove, heat to.....	Jonathan G. Hathaway.	Painesville, O.....	Dec. 7
Cooking stove, heating.....	William B. Kimball...	Peterborough, N. H.	July 19
Cooking stove, heating.....	Rufus S. Payne.....	West Springfield, Massachusetts.	July 31
Cooking stove, heating.....	Philip Wilcox.....	Springfield, Mass...	Sept. 12
Cooking stove, heating buildings...	Washington Auld and Jas. Cox.	Philadelphia, Pa....	May 30
Cooking stove and warming rooms.	John Morris.....	Derby, Conn.....	Nov. 4
Fireplace and grate, open.....	Roger M. Sherman...	Fairfield, Conn.....	June 30
Fuel, burning, &c.....	Thomas Pearson.....	Monroe Works, N. York.	July 17
Furnaces, cooking.....	Horace Gleason.....	Boston, Mass.....	Dec. 15
Furnaces, heated air to.....	John Silsbe.....	Tyrone, N. Y.....	Aug. 8
Grates and fireplace.....	Ellison Conger.....	Newark, N. J.....	July 22
Grates, &c., register and air-box for.	Allen Pollock.....	Boston, Mass.....	M. 3
Grates, revolving and shifting.....	Enos B. M. Hughes...	New Haven, Conn...	July 29
Grates, sliding flute.....	Daniel Dermand.....	New York city.....	Dec. 26
Grates and stoves.....	Edward H. Dixon.....	New York city.....	Aug. 8
Lamps.....	Samuel Rust.....	New York city.....	Apr. 20
Lamps.....	Samuel Rust.....	New York city.....	June 30
Lamps and lamp torches.....	Jeremiah Martin.....	Boston, Mass.....	June 30
Lamps, patent.....	Samuel Rust.....	New York.....	Sept. 25
Ovens, railway.....	Sewell Short.....	Nantucket, Mass....	Sept. 6
Ovens for stoves.....	David W. Barker.....	Clyde, N. Y.....	July 29
Steaming and mashing apples.....	John Drum.....	Greenwood, Pa.....	Dec. 1
Stoves.....	John Collum.....	Grafton, Mass.....	July 31
Stoves, anthracite coal.....	Aaron O. Price.....	Newark, N. J.....	June 14
Stoves, anthracite coal.....	Jordan L. Mott.....	New York city.....	July 22
Stoves, construction of (antedated March 8, 1837.)	George F. Hopkins...	New York city.....	Sept. 8
Stoves, construction of.....	Thomas Mills.....	Havana, New York.	Sept. 25
Stoves, construction of.....	Henry R. Roath.....	Norwich, Conn.....	Nov. 4
Stoves and grates, boilers and ovens.	Caleb Slade.....	Troy, N. Y.....	Nov. 11
Stoves, heating apartments.....	Philip Wilcox.....	Springfield, Mass...	July 31
Stoves, heating irons for tailors...	Bartholomew W. Tabor	Falmouth, Mass....	June 10
Stoves, non-radiating hot-air.....	Benjamin Blany.....	Boston, Mass.....	Sept. 8
Stoves, parlor.....	Jordan L. Mott.....	New York city.....	Dec. 7
Stove-pipes and drums.....	Merret Bradford.....	Saugerties, N. Y....	Mar. 25
Stoves, quadrant hinge for.....	Ebenezer Burrows....	Boston, Mass.....	Aug. 31
Stoves, radiators.....	Ethan A. Andrews....	Boston, Mass.....	May 30
Stoves, rotary.....	Rensselaer D. Granger.	Troy, N. Y.....	July 17

CLASS VI.—*Steam and gas engines, including boilers and furnaces therefor, and parts thereof.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Boilers, steam.....	James J. Rush.....	Philadelphia, Pa....	June 2
Boilers, steam.....	James M. Whittemore.	Brighton, Mass.....	Nov.
Explosion of boilers, preventing...	Augustus Eitelgeorge..	Cincinnati, Ohio....	May
Heating water for steam engines...	Ross Winans.....	Baltimore, Md.....	July
Locomotive power, engine for re- moving houses.	Stephen Compton, jr..	Almira, N. Y.....	July
Pistons, metallic, for steam engine pumps.	John Swainson.....	New York.....	Mar.

IV.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Pistons, packing.....	John Williamson.....	New York.....	Aug. 31
Pump, air, for steam engines.....	Thos. B. Stillman.....	.....do.....	May 15
Spark-catcher, &c.....	William Duff.....	Baltimore, Md.....	Dec. 20
Spark-catcher, centrifugal, &c.....	James Stimpson.....	.....do.....	April 17
Steam engine, locomotive.....	Ross Winans.....	.....do.....	July 29
Steam engine, locomotive.....	Ross Winans.....	.....do.....	July 29
Steam engine, locomotive.....	Samuel Wright.....	Philadelphia, Pa.....	Dec. 26
Steam engine, locomotive, blowing fire.	Ross Winans.....	Baltimore, Md.....	July 29
Steam engine, locomotive, framing.	Ross Winans.....	.....do.....	July 29
Steam engine, rotary.....	Roger M. Sherman.....	Fairfield, Conn.....	April 25
Steam engine, rotary.....	D. Gramis & D. E. Brand	Collins, N. Y.....	July 29
Steam engine, rotary.....	Asa Miller.....	Lockport, N. Y.....	Aug. 8
Steam, generating.....	William Creed.....	Boston, Mass.....	Dec. 26
Valve puppet.....	John Kirkpatrick.....	Baltimore, Md.....	Sept. 25
Valve slide.....	John Kirkpatrick.....	.....do.....	Sept. 22

CLASS VII.—*Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion; diving dresses, life preservers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Boats, canal, bays, &c.....	Abraham Morrison....	Johnstown, Pa.....	May 15
Capstans for ships, &c.....	Increase Wilson and Francis D. Beckwith.	New London, Conn.	June 15
Constructing ships.....	Samuel E. Howell....	Vincent Town, N. J.	Aug. 31
Grappling irons for raising bodies, &c.	Eben. & Thos. J. Lobdell	Kymton and Boston, Mass.	Aug. 18
Ice-breaker.....	Barnabas Gillespie....	New York.....	Mar. 8
Mallet, screwing and worming....	John B. Petitval.....	Charleston, S. C....	July 11
Parcelling rope, (antedated March 25, 1837.)	Obed Kempton.....	New Bedford, Mass.	Sept. 25
Propelling boats, canal, &c.....	John Finley.....	Baltimore, Md.....	April 17
Propelling boats.....	J. J. Greenaugh.....	Boston, Mass.....	Aug. 18
Propelling paddles used as ice-breakers.	Washington Van Duzen	Kensington, Pa.	July 29
Propelling paddle-wheels.....	Jesse Ong.....	N. Huntington, Pa..	May 22
Propelling paddle-wheels, steam-boats.	Wm. A. Douglas.....	Albany, N. Y.....	July 31
Sounding instrument for ascertaining the depth of water, &c.	John B. Ogden and John Ericson.....	New Jersey, and subject of the kingdom of Sweden.	July 19
Steering apparatus for ships, &c....	Samuel Nicolson.....	Boston, Mass.....	Sept. 12
Steering wheel for ships, &c.....	Andrew Morse.....	.....do.....	Dec. 1
Vessels used as life preservers....	John McIntosh.....	New York.....	Nov. 11

IV.—*Classified list of patents, &c.*—Continued.CLASS VIII.—*Mathematical, philosophical, and optical instruments, including clocks, chronometers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Circumferenter	James McCann.....	New Market, Va....	1837. Dec. 20
Electro-magnetism	Thomas Davenport....	Brandon, Vt.....	Feb. 25

CLASS IX.—*Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bridges.....	Francis Good.....	New London, Pa....	1837. Nov. 4
Dock, floating, dry.....	James Barron.....	Philadelphia, Pa....	July 17
Dock, floating, dry.....	John Thomas.....	New York city.....	Dec. 20
Inclined planes, ascending and descending of cars and canal boats.	Gideon Brown.....	New York city.....	Oct. 6
Inclined planes, ascending and descending upon railroads, &c.	Elisha F. Aldrich.....	New York city.....	Oct. 12
Railroad.....	Isaac Cooper.....	Johnstown, Pa.....	July 22
Railroad frog.....	George S. Giggis.....	Roxbury, Mass.....	July 31
Railroad, rails for.....	John Ruggles.....	Thomastown, Me....	May 22
Railroad rails, constructing and fastening.	Peter Henry Dreyer...	New York.....	Oct. 18
Railroad road, stops for.....	Thomas J. West.....	White Hall, Va....	Mar. 11
Railroad, single.....	Uri Emmons.....	Freehold, N. J.....	Apr. 17
Railroad, turnabout for.....	Jeremiah Myers.....	Attleborough, Mass.	May 8

CLASS X.—*Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Axle, and thorough boxes for carriages.	William Slicer.....	Baltimore, Md.....	1837. July 5
Axletrees, &c., setting.....	Timothy Fessenden...	Boston, Mass.....	Sept. 25
Car and circular railroad.....	James Rowe.....	Triana, Ala.....	Oct. 23
Car, railroad, &c., mode of connecting.	Robert Grant.....	Philadelphia, Pa....	July 22
Car, railroad safety.....	William Kinkead.....	Elkton, Md.....	Dec. 29
Car, railroad, supporting the bodies	Richard Inlay.....	Philadelphia, Pa....	Sept. 21
Carriages, construction of.....	Saml. C. Brown and Levi J. Hicks.	Macedon, N. Y.....	July 17
Link, self-separating, for connecting railroad cars, &c.	Conrad H. Hunt and Wm. Brown.	Fredericksburg, Va..	Dec. 26

IV.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Mail carriages, waterproof.....	Bazil B. Pleasants.....	Brookville, Md.....	Dec. 7
Sleds, hold-back for.....	James Andrews.....	Camden, Me.....	Feb. 16
Springs, carriage, railroad cars, &c.	Porter Hill.....	Veteran, N. Y.....	Nov. 25
Springs, spiral, to elliptical or bow for carriages.	William Creasdale.....	Hartsville, Pa.....	Feb. 3
Tire bending.....	Thomas C. Barton....	New York city.....	July 31
Tire, for wheels, drilling.....	Thomas C. Barton....	New York city.....	July 31
Wheels, driving of locomotive en- gines, increasing the adhesion.	Andrew M. Eastwick..	Philadelphia, Pa....	Nov. 20
Wheel hubs.....	Howard Delano.....	Skaneateles, N. Y...	Oct. 28
Wheel hubs, boring.....	James Hinds.....	Troy, N. Y.....	Nov. 25
Wheel hubs, boring and mortising	James Tompkins.....	Conesville, N. Y....	Oct. 6
Wheel hubs, carriage or wagon...	Abraham Randel.....	Vernon, N. Y.....	Sept. 8
Wheels of locomotives, ascending inclined planes.	Elisha Town.....	Montpelier, Vt.....	July 31

CLASS XI.—*Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivery of fluids.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Cistern, rain water.....	George O. Blennis....	Salina, N. Y.....	Aug. 18
Compressed air for drawing liquids.	Jasper Johnson.....	Genesee, N. Y.....	May 30
Fluids, measuring.....	James Bogardus.....	New York.....	Oct. 12
Pump, forcing, double.....	D. L. Farnam.....	New York.....	Oct. 23
Pump, preventing water from freez- ing.	Samuel Adams.....	Townsend, Mass...	Mar. 11
Pump for ships.....	David Gay.....	Bath, Me.....	Sept. 8
Pump, suction and force.....	Abraham Kassler.....	Canajoharie, N. Y...	Oct. 28
Pump, suction and force.....	Jonathan Stevens....	Newark, N. J.....	Dec. 20
Pump, valves for.....	Henry Hickman.....	Newburg, Pa.....	July 17
Waterwheel.....	Nehemiah P. Stanton..	Syracuse, N. Y.....	May 22
Water-wheel.....	Clayton Parker and R. W. Engle.	Wayne township, O.	July 31
Water-wheel, current.....	Warren P. Wing.....	Greenwich, Mass...	Sept. 22
Water-wheel, horizontal.....	Chapman Warner.....	Oxford, N. J.....	Sept. 22
Water-wheel, horizontal.....	Samuel Curtis.....	Eagle, N. Y.....	Dec. 15
Water-wheel, letting on water....	Samuel Curtis.....	Eagle, N. Y.....	Sept. 28
Water-wheel, reacting.....	Gideon Hotchkiss.....	Windsor, N. Y.....	Jan. 9
Water-wheel, reacting.....	Nelson Johnson.....	Erwin Centre, N. Y.	Nov. 23
Water-wheel, spiral bucket.....	Joseph C. Greene.....	Payette, Me.....	May 30
Water-wheel, tub.....	David P. Napier.....	Liberty, Ky.....	May 22
Wind-wheel.....	Ebenezer B. Sperry...	Wenham, Mass.....	Aug. 31
Wind-wheel.....	Jacob D. Makely.....	Cairo, N. Y.....	Nov. 23

IV.—*Classified list of patents, &c.*—Continued.CLASS XII.—*Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Balance.....	B. Morison.....	Milton, Pa.....	Feb. 16
Balance, platform.....	Benjamin Bull.....	New York city.....	May 3
Elevating hay.....	George Wilbur.....	Macedon, N. Y.....	July 17
Packing flour and pressing.....	Oliver Jewett.....	Rochester, N. Y.....	Mar. 30
Press, cheese.....	Sullivan White.....	Bridgewater, Vt.....	Aug. 31
Press, cotton and hay.....	Gideon Fitz.....	Clinton, Miss.....	June 3
Press, hay.....	Jacob Grovenor.....	New York city.....	Aug. 31
Press, rotary, for woollen goods...	Moses Bayley.....	Salisbury, Mass.....	July 5
Press, standing.....	Joel Barns.....	Philadelphia, Pa.....	Ap'l 17
Press, tobacco.....	James H. Washington.	Baltimore, Md.....	Oct. 12
Press, tobacco, cast-iron cases.....	Granville D. Allen....	Richmond, Va.....	June 30
Press, tobacco, for rolled.....	James T. Bowman....	Pattonsburg, Va.....	July 5

CLASS XIII.—*Grinding mills and mill-gearing, containing grain mills, mechanical movements, and horse-powers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Bark-mill.....	Charles Parker.....	Meriden, Ct.....	Nov. 25
Coffee-mill.....	Hiram Twiss.....	Meriden, Ct.....	Nov. 19
Grist-mill.....	Oliver Wyman.....	E. Cambridge, Mass.	Dec. 20
Grist-mill.....	Elijah S. Curtis.....	Boston, Mass.....	Nov. 23
Horse-power.....	Levi Rice.....	Attleborough, Pa.....	July 17
Horse-power.....	Levi Rice and David Congdon.	West Chester, Pa...	July 17
Horse-power.....	Barnabas Langdon*...	Troy, N. Y.....	July 19
Horse-power.....	Henry Smith.....	Bethel, Ohio.....	Oct. 6
Horse-power.....	Benjamin Hinkley....	Fayette, Me.....	Nov. 25
Horse-power, endless chain.....	Jacob G. Hall.....	Zanesville, Ohio.....	Sept. 21
Horse-power, endless chain.....	Aaron Palmer.....	Akron, N. Y.....	Sept. 22
Horse-power, endless chain.....	Henry G. Hall.....	Putnam, Ohio.....	Sept. 28
Horse-power, portable frame-work of.	John A. Nelson & Jas. P. Ross.	Lewisburg, Pa.....	June 30
Wheel-band, mode of hanging.....	Isaac Straub.....	Lewiston, Pa.....	July 11

CLASS XIV.—*Lumber, including machines and tools for preparing and manufacturing, such as sawing, planing, mortising, shingle and stave, carpenters' and coopers' implements.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Boring and mortising.....	John H. Power.....	Norwalk, Ohio.....	Jan. 31
Clapboards, sawing.....	Samuel Gross.....	Milford, N. H.....	June 3
Clasps in saw-mill gates.....	Hy. & Nelson Johnson	Erwin, N. Y.....	May 15
Dye-woods, cutting.....	Lucilius H. Mosely...	Poughkeepsie, N. Y.	June 23
Dye-woods, cutting and reducing...	Abner McMillen.....	Bedford, N. H.....	Dec. 2

IV.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Lathe, turning mouldings and beads	Eli Coddington	Thompson, N. Y....	July 31
Mortising posts and sharpening rails	Wandle Mace	New York	Mar. 11
Mortising timber	Thos. H. Hoskings ...	Springfield, Ohio....	June 30
Pegs, cutting and pointing.....	Joseph Essex.....	Killingly, Ct.	July 17
Planing machine.....	Alonzo G. Hull.....	Brooklyn, N. Y....	Sept. 20
Planing boards, &c.....	Samuel Whitney.....	Dunstable, N. H....	June 3
Planing, mouldings in wood, &c...	Ambrose Church, jr...	Canandaigua, N. Y..	July 29
Sawing trees	Samuel H. Hamilton ..	New York.....	Dec. 7
Saw mills.	John Ambler	Philadelphia, Pa....	Dec. 1
Shingles, &c., cutting from steam timber.	Joseph S. Raymond...	Lodi, N. Y.....	Aug. 15
Shingles, dressing and smoothing ..	George L. Day.....	Union, N. Y.....	July 29
Shingles, gauges of machines for sawing.	Elkanah Leonard.....	Canton, Me.....	Nov. 4
Shingles, riving, planing, and jointing, antedated June 15, 1837.	Enoch R. Morrison....	Pittsburg, Pa.....	Aug. 8
Shingle sawing	Apollos Wilbur.....	Burrellville, R. I....	Mar. 25
Shingle sawing	Samuel Goss	Milford, N. H.....	June 3
Shingle sawing	Zebulon Sargent	Contoocookville, N. Hampshire.	Dec. 1
Shingles, shaving.....	Aaron H. Aiken	Sparta, Pa.....	Nov. 4
Shingles and staves, &c., cutting...	George Pack	Peterborough, N. Y..	Nov. 11
Spokeshave	Ira L. Beckwith	Quincy, Mass.....	April 29
Staves, cutting, for barrels	Thomas Peck.....	Lenox, N. Y.....	Nov. 20
Staves, sawing	Harvey Holmes	New Marlborough, Mass.	Dec. 20
Staves, sawing, for barrels	Jesse J. Smith.....	Brutus, N. Y.....	Mar. 3
Veneers, cutting.....	Joseph Skinner.....	Stockbridge, Mass...	Sept. 21
Weather strips to bottom of doors..	Isaac D. Brower	New York city.....	July 29

CLASS XV.—*Stone and clay manufacture, including machines for pottery, glass making, dressing and preparing stone, cements, and other building materials.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Brick machine.....	Gaylord V. Harper....	Franklinville, N. Y..	Oct. 23
Brick making and drying	James Hodges.....	Fairplay, S. C.....	June 3
Brick mould	Benjamin H. Brown...	Alexandria, D. C....	Oct. 23
Brick moulding and pressing.....	Nathaniel Adams	Cornwall, N. Y.....	Sept. 8
Brick moulding and pressing.....	Henry Waterman.....	Bath, Me.....	Nov. 4
Brick press	Andrew F. Mervine...	St. Louis, Mo.....	Sept. 12
Granite cutting and dressing.....	Wm. C. Poland and Earle Blossom.	Portland, Me.....	Nov. 11
Granite cutting and polishing.....	John D. Buzzel.....	Cape Elizabeth, Me..	May 15
Lime, process of burning.....	Samuel Garber & Henry Swartzengrouer.	Norristown, Pa.....	Mar. 25
Stone cutting and dressing.....	Mighill Nutting.....	Portland, Me.....	May 15
Stone, dressing	Nathan Jacobs.....	Newark, O.....	Mar. 11
Stone, facing and dressing.....	David Hull and Jo. Critcherson.	Portland, Me.....	May 8

IV.—*Classified list of patents, &c.*—Continued.CLASS XVI.—*Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Boots, crimping leather for.....	Jesse Van Winkle.....	Rochester, N. Y....	April 17
Boots, crimping leather for.....	Moses S. Woodward..	Marshallton, Pa....	July 31
Boot trees.....	David Hastings.....	Deerfield, Mass....	Dec. 15
Coloring and finishing leather	Harmon Hibbard.....	Attica, N. Y.....	Dec. 15
Cutting leather.....	Levi N. Leland.....	Grafton, Mass.....	Sept. 23
Harness fastenings.....	Warner Hayden.....	New Milford, Pa....	Jan. 21
Harness for horses in shafts.	Robert Beale	Washington, D. C..	June 15
Hides, breaking and softening.....	Eli Kendal	Newton, Mass.....	June 10
Hides, scraping.....	Reuben Shailer.....	Haddam, Ct.....	June 19
Saddles, bow and worm, spring for.	Jonathan Keedy.....	Russelville, Ky	Aug. 18
Saddles for removing the sick.....	Hezekiah L. Thistle..	New Orleans, La....	Jan. 21
Saddles, spring.....	John G. Manlove.....	Bainbridge, O.....	Mar. 25
Saddles, spring.....	Henry Sheets.....	Staunton, Va.	Mar. 30
Saddles, spring.....	Moses Baldwin.....	Cincinnati, O.....	April 29
Saddles, spring.....	Harman C. Fisher....	Warwick, R. I.....	Nov. 25
Saddles, spring.....	John D. Payne.....	Warm Springs, Va..	Nov. 25
Saddles, spring seat, riding.....	Robert Wilson.....	Milton, Pa.....	Mar. 11
Saddle trees.....	William Kelly.....	New Columbus, Pa..	May 30
Saddle-bag fastening.....	Alvin North.....	North Britain, Conn.	Dec. 29
Shoemakers, clamp for.....	Richard Emans.....	Mansfield, N. J....	Oct. 6
Skins, extracting hair from.....	Edward Flint.....	New York city.....	June 30
Skiving, removing wool	Benjamin F. Emery...	Bath, Me.....	July 30
Trunks, valises, &c.....	Matthias Steiner.....	New York city.....	Dec. 20

CLASS XVII.—*Household furniture, machines, and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Cutting, meat.....	John Morris.....	Derby, Ct.....	Nov. 20
Feathers, dressing and cleaning....	Samuel Swett, Jr.....	Readfield, Me.....	July 31
Mopheads	Jacob Howe.....	Worcester, Mass....	June 15
Refrigerator.....	J. D. Burns.....	Baltimore, Md.....	Nov. 11
Washing machine.....	William Hovey.....	Worcester, Mass....	Feb. 4

IV.—*Classified list of patents, &c.*—Continued.CLASS XVIII.—*Arts, polite, fine, and ornamental, including music, painting, sculpture, engraving, books, paper, printing, binding, jewelry, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Binder for newspapers.....	Ezra Ripley	Troy, N. Y.....	Dec. 26
Blocks for printing colors on silks..	John Crabtree	New York	Dec. 7
Book-binding.....	William Hancock.....	Great Britain.....	Oct. 28
Coloring maps, process, &c.....	Lucius Stebbins.....	Hartford, Ct.....	July 11
Inking rollers, temperature of, &c..	Eliphaz Weston Arnold.	Boston, Mass.....	Sept. 21
Piano forte, action of.	Thomas Loud	Philadelphia, Pa....	Dec. 7
Printing both sides of a continuous sheet.	Thomas French.....	Ithaca, N. Y.....	Nov. 20

CLASS XIX.—*Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Cannon, cast-iron	Cyrus Alger.....	Boston, Mass.....	May 30
Cannon, pointing	John Hobday	Portsmouth, Va....	May 3
Carriage, gun, on ship-board	John Bubier.....	Marblehead, Mass...	Oct. 20
Fire-arms.....	Elijah Fisher and D. H. Chamberlain.	Boston, Mass.....	April 17
Fire-arms.....	Henry Harrington...	Southbridge, Mass...	July 29
Fire-arms, loading, mode of.....	Thomas McCarty....	Elmira, N. Y.....	Mar. 11
Fire-arms, many-chambered.....	John W. Cochran.....	New York.....	April 29
Fire-arms, many-chambered.....	Daniel Leavitt.....	Cabotsville, Mass...	April 29
Fire-arms, many-chambered.....	Curtis Parkhurst....	Lawrenceville, Pa...	Sept. 25
Fire-arms, many-chambered, cylinder, (antedated April 28, 1837.)	John W. Cochran.....	New York.....	May 8
Fire-arms, many-chambered, cylinder.	Otis W. Whittier.....	Enfield, N. H.....	May 30
Fire-arms and ordnance.....	Henry C. Fay	Lancaster, Mass....	May 22
Fire-arms, self-loading, and priming.	Silas Day	City of New York..	Aug. 31
Knives, or dirks, attaching to pistols.	Robert W. Andrews..	Stafford, Ct.....	July 31
Locks for fire-arms.....	Ethan S. Chapin.....	Stafford Spring, Ct..	July 17
Locks for fire-arms.....	Ethan Allen.....	Grafton, Mass.....	Nov. 11
Pistols, knife, or cutlass	George Elgin	New York.....	July 5
Pistols, sabre.....	Robert W. Lawton....	Newport, R. I.....	Nov. 30

IV.—*Classified list of patents, &c.*—Continued.CLASS XX.—*Surgical and medical instruments, including trusses, dental instruments, bathing apparatus, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Bandages, pads.....	Robert Thompson.....	Columbus, Ohio.....	Jan. 29
Teeth, artificial.....	Charles M. Graham ...	Philadelphia, Pa.....	Mar. 9
Truss for hernia.....	Elijah Jaquith.....	Brattleborough, Vt ..	Mar 11
Truss for hernia.....	Heber Chase, M. D....	Philadelphia, Pa.....	June 10
Truss for hernia.....	Richard Salisbury.....	Providence, R. I.....	Nov. 4
Truss for hernia.....	Josiah Hungerford	Dover, N. H.....	Dec. 26

CLASS XXI.—*Wearing apparel, articles for the toilet, &c., including instruments for manufacturing.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Bodkin for inserting corset rings into cloth.	Jonathan S. Turner....	Middletown, Ct.....	April 25
Garments, cutting.....	Andrew Wiswell.....	Exeter, N. H.....	July 11
Garments, draughting coats, geometrical measure for.	William C. Bishop....	Ovid, N. Y.....	April 25
Garments, draughting forepart of coats.	Allen Ward.....	Moyamensing, Pa....	Sept. 23
Garments, pantaloons measurer....	Edward Grimston.....	Danvers, Mass.....	Sept. 21
Garments, standard measure for coats.	Erastus Barber.....	Boston, Mass.....	Dec. 36
Tailoring, system of.....	Amos Sherman.....	Newark, N. J.....	July 17

CLASS XXII.—*Miscellaneous.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1837.
Ice, preparing, for shipping.....	Nathaniel J. Wyeth ...	Cambridge, Mass ...	Dec. 1
Splints for friction matches.....	Stephen Dole.....	Concord, N. H.....	May 30
Tobacco spinning.....	Hiram M. Smith.....	Richmond, Va.....	Dec. 20

List of designs that have expired during the years 1849 and 1850, heretofore inadvertently omitted, together with a list of those that expire in 1851.

Designs.	Patentees.	Residence.	Date of patent.	Expired.
Types, for	George Bruce.....	New York.....	Nov. 9, 1843	1849
B-binding tub.....	Jordan L. Mott.....	New York.....	Aug. 17, 1843	1850
Corpse preserver.....	John Good.....	Philadelphia, Penn.....	Aug. 17, 1843	1850
Carpets, painted.....	James Albro, jr.....	Elizabethtown, N. J.....	Oct. 6, 1843	1850
Coffee pots.....	John R. Remington.....	Lowndes county, Ala.....	Oct. 6, 1843	1850
Carpets.....	John P. Ferguson.....	Thompsonville, Conn.....	Oct. 20, 1843	1850
Cloths, floor, printing.....	James Albro, jr.....	Elizabethtown, N. J.....	Dec. 20, 1843	1850
Cloths, floor, printing.....	James Albro, jr.....	Elizabethtown, N. J.....	Dec. 20, 1843	1850
Girandoles, (assigned to H. N. Hooper & Co., Boston, Mass.).....	Wm. Blake.....	Boston, Mass.....	Dec. 20, 1843	1850
Lamps.....	Wm. W. Bacon.....	Middletown, Conn.....	Mar. 17, 1843	1850
Metals, impression on, (assigned to L. C. Ives, Bristol, Conn.).....	Waterman L. Ormsby.....	New York.....	Oct. 18, 1843	1850
Springs, door.....	Isaac B. Hartwell.....	New York.....	Feb. 24, 1843	1850
Stove columns, (assigned to Johnson, Geer & Cox).....	Ezra Ripley.....	Woodstock, Vt.....	April 10, 1843	1850
Statues.....	Alonzo L. Blanchard.....	Troy, N. Y.....	July 15, 1843	1850
Stoves, cooking.....	Alanson Skinner.....	Albany, N. Y.....	Aug. 26, 1843	1850
Stoves.....	Jordan L. Mott.....	Brownsville, N. Y.....	Sept. 14, 1843	1850
Bust of Theodoric Frelinghuysen, (assigned to J. G. Wellstood).....	Salathiel Ellis.....	New York.....	Dec. 1, 1843	1850
Bust of Robert Burns.....	John C. King.....	New York.....	Aug. 12, 1844	1851
Carpets, canvass.....	Jacob D. Edwards.....	Boston, Mass.....	Jan. 31, 1844	1851
Carpets.....	Henry G. Thompson.....	Elizabethtown, N. J.....	Mar. 20, 1844	1851
Grates.....	Adam Hampton.....	New York.....	April 4, 1844	1851
Pencil cases.....	George W. Simons.....	New York.....	May 17, 1844	1851
Stoves.....	Amaziah Whitney.....	Philadelphia, Penn.....	Nov. 18, 1844	1851
Stove-plate, (assigned to Johnson, Geer & Cox, Troy, New York).....	Ezra Ripley.....	Albany, N. Y.....	July 19, 1844	1851
Spoons, forks, &c.....	Michael Glibney.....	Troy, N. Y.....	Nov. 26, 1844	1851
Whistle, child's.....	Henry Dubosq.....	New York.....	Dec. 4, 1844	1851
		Philadelphia, Penn.....	May 6, 1844	1851

Alphabetical list of persons whose patents have expired during the year 1851, with their inventions or discoveries, and class.

Patentees.	Inventions or discoveries.	Class.
Abbott, Andrew.....	Cooking stove.....	V.
Adams, Isaac.....	Hulling coffee berry.....	I.
Adams, Samuel.....	Pumps.....	XI.
Adams, Nathaniel.....	Brick, moulding and pressing.....	XV.
Akin, Aaron.....	Shingle shaving.....	XIV.
Aldrich, Elisha F.....	Inclined planes.....	IX.
Allen, Granville D.....	Tobacco press.....	XII.
Alger, Cyrus.....	Cannon, cast.....	XIX.
Allen, Ethan.....	Locks for fire-arms.....	XIX.
Ames, John.....	Paper sizing.....	III.
Ambler, John.....	Saw mill.....	XIV.
Andrews, Ethan A.....	Stove radiators.....	V.
Andrews, James.....	Sleds, hold back for.....	X.
Andrews, Robert W.....	Knives or dirks, attaching, to pistols.....	XIX.
Arnold, Eliphaz W.....	Inking rollers, temperature of, &c.....	XVII.
Austin, William E.....	Door plates.....	II.
Auld, Washington, and James Cox.....	Cooking stove, heating buildings, &c.....	V.
Barton, William M.....	Hulling clover seed.....	I.
Barker, John.....	Blow-pipe for blast furnaces.....	II.
Barker, John.....	Blast furnace.....	II.
Barron, James.....	Cooking stove and galley.....	V.
Barker, David W.....	Ovens for stoves.....	V.
Barrows, Ebenczer.....	Stoves, quadrant hinge for.....	V.
Barron, James.....	Dock, floating, dry.....	XIX.
Barton, Thomas C.....	Tire bending.....	X.
Barton, Thomas C.....	Tire for wheels, drilling.....	X.
Bayley, Moses.....	Press, rotary, for woolen goods.....	XI.
Barnes, Joel.....	Press, standing.....	XII.
Baldwin, Moses.....	Saddles, spring.....	XVI.
Barber, Erastus.....	Garments, standard measure for coats.....	XXI.
Berry & Rand.....	Nails and brads, cutting.....	II.
Beckwith, Ira L.....	Spokeshave.....	XIV.
Bishop & Brooks.....	Nails, wrought.....	II.
Beale, Robert.....	Hames for harness in shaft.....	XVI.
Bishop, William C.....	Garments, draughting coats, &c.....	XXI.
Blackall, Joseph.....	Screws, cutting.....	II.
Blanchard, Thomas.....	Hats, bodies, batting, or web for.....	III.
Blaney, Benjamin.....	Stoves, non-radiating, &c.....	V.
Blenis, George O.....	Cistern, rain-water.....	XI.
Bowling, Alexander W.....	Threshing machine.....	X.
Bogardus, James.....	Fluids, measuring.....	XI.
Bowman, James T.....	Press, tobacco, for rolled.....	XII.
Brooks, Jonathan.....	Threshing and hulling clover seed.....	I.
Broadmeadow, Simeon.....	Furnace for shear-steel, &c.....	II.
Broadmeadow.....	Furnace for smelting ore.....	II.
Brittain, William and Robert.....	Flax and hemp dressing.....	III.
Branch, Hardin.....	Cooking, generating steam for.....	V.
Bradford, Merritt.....	Stove pipes and drum.....	V.
Brown, Gideon.....	Inclined planes.....	IX.
Brown & Hicks.....	Carriages, disengaging horses from.....	X.
Brower, Isaac D.....	Weather strips, &c.....	XIV.
Brown, Benjamin H.....	Brick mould.....	XV.
Bunnell, Isaiah.....	Strainers for milk pails.....	I.
Butler, Lester.....	Winnowing, separating, &c.....	I.
Burt, Enoch.....	Loom.....	III.
Bull, Benjamin.....	Balance platform.....	XII.
Buzzell, John D.....	Granite cutting and polishing.....	XV.
Burns, R. D.....	Refrigerator.....	XVII.
Bubier, John.....	Carriage, gun, on ship-board.....	XIX.
Childs, Charles D.....	Smut machine.....	I.
Church, Ambrose, jr.....	Planing, mouldings on wood.....	XIV.

Alphabetical list of persons, &c.—Continued.

Patentees.	Inventions or discoveries.	Class.
Chapin, Ethan S.....	Locks for fire-arms.....	XXI.
Chase, Heber.....	Truss for hernia.....	XX.
Clements, Garret.....	Leaching ashes.....	IV.
Coats, Stephen.....	Rake, revolving.....	I.
Coyle, Thomas.....	Cement for cisterns.....	IV.
Cox, William.....	Paint, composition.....	IV.
Conger, Ellison.....	Grates and fireplace.....	V.
Collum, John.....	Stoves.....	V.
Compton, Stephen, jr.....	Locomotive power, &c.....	VI.
Cooper, Isaac.....	Railroad.....	XIX.
Coddington, Eli.....	Lathe, turning, mouldings and.....	XIV.
Cochran, John W.....	Fire-arm, many-chambered.....	XIX.
Cochran, John W.....	Fire-arms, many-chambered, &c.....	XIX.
Crompton, William.....	Loom, power, figure.....	III.
Creswell, James.....	Oleagenous seed, &c.....	IV.
Creed, William.....	Steam, generating.....	VI.
Creasdale, William.....	Spring, spiral, &c.....	X.
Crabtree, John.....	Blocks for printing colors, &c.....	XVIII.
Curtis, Samuel.....	Water-wheel, horizontal.....	XI.
Curtis, Samuel.....	Water-wheel, letting on water.....	XI.
Curtis, Elisha S.....	Grist mill.....	XII.
Davenport, Moses.....	Threshing and winnowing.....	I.
Davenport, Thomas.....	Electro-magnetism.....	VIII.
Day, Silas.....	Fire-arms, self-loading, &c.....	XIX.
Deats, John.....	Plough.....	I.
Dewey, David.....	Rake, horse.....	I.
Dean, Linus.....	Vice, bench and other.....	II.
Dear, David.....	Bitterings from kettles, &c.....	IV.
Desmond, Daniel.....	Grates, sliding flute.....	V.
Delano, Howard.....	Wheel hubs.....	X.
Dixon, Edward H.....	Grates and stoves.....	V.
Douglass, William A.....	Propelling paddle-wheels, &c.....	VII.
Dole, Stephen.....	Splints for friction matches.....	XXII.
Dunn, John.....	Steaming and mashing apples.....	V.
Deff, William.....	Spark-catcher, &c.....	VI.
Dreyer, Peter Henry.....	Railroad rails, &c.....	IX.
Eastwick, A. M.....	Wheels driving locomotive engines, increas- ing adhesion.....	X.
Eitelgeorge, Augustus.....	Explosion of boilers, preventing.....	VI.
Elgin, George.....	Pistols, &c.....	XIX.
Emmons, Uri.....	Railroad, single.....	IX.
Emans, Richard.....	Shoemakers, clamp for.....	XVI.
Emery, B. F.....	Skiving, removing wool.....	XVI.
Essex, Joseph.....	Pegs, cutting and pointing.....	XIV.
Farnham, D. L.....	Pump, forcing, double.....	XI.
Fay, Henry C.....	Fire-arms and ordnance.....	XIX.
Fessenden, William G.....	Bark, extract of.....	IV.
Fessenden, Timothy.....	Axletrees, &c., setting.....	X.
Fitzgerald, Daniel.....	Fire-proof safe.....	II.
Frickhardt, F. A.....	Air to wood and coal stoves.....	V.
Finley, John.....	Propelling boats, screw for.....	VII.
Fitz, Gideon.....	Press, cotton.....	XII.
Fisher, H. C.....	Saddle, spring.....	XVI.
Fisher & Chamberlain.....	Fire-arms.....	XIX.
Flockton, Webster.....	Metallic solution for preserving timber.....	IV.
Flint, Edward.....	Skins, extracting hair from.....	XVI.
Fredly, Frederick.....	Iron, &c., washing ores.....	II.
French, Thomas.....	Printing both sides of a continuous sheet.....	XVIII.
Gay, Charles S.....	Latch mortice.....	II.
Gay, David.....	Pumps for ships.....	XI.
Gayber & Swartzengrover.....	Lime, process of burning.....	XV.
Gillespie, Barnabas.....	Ice breaker.....	VII.

Alphabetical list of persons, &c.—Continued.

Patentees.	Inventions or discoveries.	Class.
Gleason, Horace.....	Furnaces, cooking.....	V.
Golding, John.....	Thread, preventing from waste.....	III.
Goodyear, Charles.....	Caoutchouc, divesting of its adhesive properties.....	IV.
Gotthilf, August.....	Preserving timber from worms.....	IV.
Good, Francis.....	Bridges.....	IX.
Goss, Samuel.....	Clapboards, sawing.....	XIV.
Goss, Samuel.....	Shingles, sawing.....	XIV.
Griswold, Ogden.....	Thread, waste, reducing to cotton wool.....	III.
Gray, William.....	Thread, waste, reducing to cotton wool.....	III.
Grannis & Brand.....	Steam-engine, rotary.....	VI.
Greenaugh, J. J.....	Propelling-paddles, for boats.....	VII.
Griggs, George S.....	Railroad frog.....	IX.
Grant, Robert.....	Car, railroad, &c., mode of connecting.....	X.
Greene, Joseph C.....	Water-wheel, spiral bucket.....	XI.
Grosvenor, Jacob.....	Press, hay.....	XII.
Graham, C. M.....	Teeth, artificial.....	XX.
Grimston, Edwin.....	Garments, pantaloons measurer.....	XXI.
Harvey & Tracey.....	Hulling rice.....	I.
Hartpence & Bawne.....	Plough.....	I.
Harvey, Thomas W.....	Screw, wood, turning heads.....	II.
Hazard, Phillipe F.....	Window-fastening, combined spring.....	II.
Hammond, Henry.....	Window-sash, spring for upper sash.....	II.
Harvey, Thomas W.....	Wire, cutting and heading.....	II.
Harvey, Charles R.....	Hair-seating, weaving.....	III.
Hartford & Tilton.....	Loom treadles and harness.....	III.
Hatfield, John.....	Matches, locofoco, dipping.....	IV.
Hastings & Sikes.....	Cooking stove.....	V.
Hathaway, John G.....	Cooking stove.....	V.
Hathaway, John G.....	Cooking stove, heat to.....	V.
Hall, Jacob G.....	Horse-power, endless chain.....	XIII.
Hall, Henry G.....	Horse-power, endless chain.....	XIII.
Hamilton, Samuel H.....	Sawing trees.....	XIV.
Harper, Gaylord V.....	Brick machine.....	XV.
Hastings, David.....	Boots, trees.....	XVI.
Hayden, Warner.....	Harness and fastenings.....	XVI.
Hancock, William.....	Book-binding.....	XVIII.
Harrington, Henry.....	Fire-arms.....	XIX.
Hedge, Egbert.....	Hinges, or butt, double-centred joints.....	II.
Hedge, Lemuel.....	Joints for rules, double-centred.....	II.
Heckman, Henry.....	Pumps, valves for.....	XI.
Hill, Porter.....	Spring-carriage, railroad car, &c.....	X.
Hinds, James.....	Wheel-hubs, boring.....	X.
Hinkley, Benjamin.....	Horse-power.....	XIII.
Hibbard, Harmon.....	Coloring and finishing leather.....	XVI.
Hotchkiss, Gideon.....	Yoke, horse and oxen.....	I.
Holtman, David.....	Knobs, door, drawer, commode, &c.....	II.
Hobbs, William.....	Locks, secret, safety.....	II.
Hopkins, George F.....	Stoves, construction of.....	V.
Howell, Samuel E.....	Constructing ships.....	VII.
Hotchkiss, Gideon.....	Water-wheel, reacting.....	XI.
Hoskings, Thomas K.....	Mortising timber.....	XIV.
Harvey, Holmes.....	Stave-sawing.....	XIV.
Hodges, James.....	Brick-making and drying.....	XV.
Howe, Jacob.....	Mop heads.....	XVII.
Hovey, William.....	Washing-machine.....	XVII.
Hobday, John.....	Cannon-pointing.....	XIX.
Hutchinson, Jesse.....	Cooking stove.....	V.
Hughes, Enos B. M.....	Grates, revolving and shifting.....	V.
Hunt & Brown.....	Link, self-separating, for connecting cars, &c.....	X.
Hull, Alonzo G.....	Planing-machine.....	XIV.
Hungerford, J.....	Truss for hernia.....	XX.

Alphabetical list of persons, &c.—Continued.

Patentees.	Inventions or discoveries.	Class.
Hull & Critcherson.....	Stone-facing and dressing.....	XV.
Idler, Jacob.....	Gin, cotton, saw-cylinder.....	III.
Imlay, Richard.....	Car, railroad, supporting bodies.....	X.
Jaquith, Elijah.....	Window blinds fastener.....	II.
Jacobs, Nathan.....	Stone, dressing.....	XV.
Jaquith, Elijah.....	Truss for hernia.....	XX.
Jewett, Oliver.....	Packing flour and pressing.....	XII.
Jones, Henry C.....	Locks, mail-bag, and clasp.....	II.
Johnson, Samuel.....	Fur, cutting, from skins.....	III.
Jones, Alexander.....	Gin, cotton.....	III.
Johnson, Jasper.....	Compressed air for drawing liquids.....	I.
Johnson, Nelson.....	Water-wheel, reacting.....	XI.
Johnson, H. and N.....	Clasps in saw-mill gates.....	XIV.
Kassler, Abraham.....	Pump, suction, and force.....	XI.
Kempton, Obed.....	Parcelling rope.....	VII.
Kendall, Eli.....	Hides, breaking and softening.....	XVI.
Keedy, Jonathan.....	Saddles, bow and worm, spring for.....	XVI.
Kelly, William.....	Saddle-trees.....	XVI.
Kinney, William.....	Cooking stove, coal.....	V.
Kimball, William B.....	Cooking stove, heating.....	V.
Kirkpatrick, John.....	Valve, engines.....	VI.
Kirkpatrick, John.....	Valve, puppet.....	VI.
Kinkead, William.....	Car, railroad.....	X.
Knowles & Gibbut.....	Preserving timber, &c.....	IV.
Larimore, Wilson L.....	Cutting cradle for grain.....	I.
Langdon, Barnabas.....	Horse-power.....	XIII.
Lawton, Robert W.....	Pistols, sabre.....	XIX.
Leveridge, Walter.....	Gum Senegal, substitute for.....	IV.
Leavitt, John S.....	Cooking stove.....	V.
Leland, Levi N.....	Cutting leather.....	XVI.
Leavitt, Daniel.....	Fire-arms, many-chambered.....	XIX.
Longley & Davis.....	Flax and hemp, breaking and cleaning.....	III.
Lobdell, E and T. J.....	Grappling irons.....	VII.
Loud, Thomas.....	Piano forte, action of.....	XVIII.
Lull, Harvey.....	Flax and hemp, breaking.....	III.
Lyon, Joseph.....	Iron ore, smelting.....	II.
Mason, Samuel P.....	Loom, temple, &c.....	III.
Martin, Jeremiah.....	Lamps, &c.....	V.
Mackintosh, John.....	Vessels used as life-preservers.....	VII.
Mace, Wandle.....	Mortising posts, &c.....	XIV.
Manlove, John G.....	Saddles, spring.....	XVI.
McCormick, Stephen.....	Plough.....	I.
McClery, James.....	Lock, door.....	II.
McMullen & Hollen.....	Knitting machine.....	III.
McCann.....	Circumferator.....	VIII.
McMillen, Abner.....	Dye-woods, cutting, &c.....	XIV.
McCarty, Thomas.....	Fire-arms, loading, &c.....	XIX.
Mervine, Andrew F.....	Brick-press.....	XV.
Minell, Abraham T.....	Cooking stove.....	V.
Mills, Thomas.....	Stoves.....	V.
Miller, Asa.....	Steam engine.....	VI.
Mosely, Lucilius H.....	Gin, cotton.....	III.
Moore, Hugh.....	Hat bodies.....	III.
Moore & Bower.....	Candles, moulding.....	IV.
Morison, B.....	Plaster, adhesive, spreading.....	IV.
Morris, John.....	Cooking, steam vessel for.....	V.
Mott, Jordan L.....	Cooking stove.....	V.
Morris, John.....	Cooking stove, &c.....	V.
Mott, Jordan L.....	Stoves.....	V.
Mott, Jordan L.....	Stoves.....	V.
Morrison, Abraham.....	Boats, canal, &c.....	VII.
Morse, Andrew.....	Steering wheel.....	VII.

Alphabetical list of persons, &c.—Continued.

Patentees.	Inventions or discoveries.	Class.
Morison, B.	Balance.	XII.
Mosely, Lucilius H.	Dye-woods, cutting.	XIV.
Morrison, Enoch R.	Shingles, sawing.	XIV.
Morris, John.	Cutting meat.	XVII.
Myers, Jeremiah.	Railroad, turnabout for.	IX.
Nagle, Patrick G.	Composition for boots.	IV.
Napier, David P.	Water-wheel tub.	XI.
Nelson & Ross.	Horse-power.	XIII.
Nicolson, Samuel.	Steering apparatus.	VII.
Norton, Job B.	Plough.	I.
North, Alvin.	Saddle-bag fastenings.	XVI.
Nutting, Mighill.	Stone cutting, &c.	XV.
Oellig, John J.	Medicine, worm destroying.	IV.
Oellig, John J.	Pills, &c.	IV.
Ogden & Ericson.	Sounding instrument, &c.	VII.
Olney, James N.	Cooking stove.	V.
Ong, Jesse.	Propelling paddle-wheels.	VII.
Paimbeuf, Lewis.	Paint, protection of buildings.	IV.
Parrott, Wm. W.	Cooking apparatus.	V.
Payne, Rufus S.	Cooking stove, heating.	V.
Parker & Engle.	Water-wheel.	XI.
Parker, Charles.	Bark mill.	XIII.
Palmer, Aaron.	Horse-power, endless chain.	XIII.
Pack, George.	Shingles and staves, &c., cutting.	XIV.
Payne, John D.	Saddles, spring.	XVI.
Parkhurst, Curtis.	Fire-arms, many chambered.	XIX.
Penny, John.	Sugar manufacturing.	IV.
Pearson, Thomas.	Fuel, burning, &c.	V.
Petival, John B.	Mallet, screwing, &c.	VII.
Peck, Thomas.	Staves, cutting, &c.	XIV.
Phillips, Perigrine.	Lead, white.	IV.
Pierce, Dexter.	Cutting, scythe snath.	I.
Pitts, J. A. & H. A.	Threshing and winnowing.	I.
Pleasants, Bazil B.	Mail carriages, &c.	X.
Potter, Welcome A.	Loom, regulating, &c.	III.
Pollock, Allen.	Grates, &c., register, &c., for.	V.
Power, John H.	Boring and mortising.	XIV.
Poland & Blossom.	Granite cutting, &c.	XV.
Price, Aaron O.	Stoves, anthracite coal.	V.
Randel, Abraham.	Wheel hubs, carriage or wagon.	X.
Reed, Clement O.	Screw, wood.	II.
Reed, Edwin.	Cooking stove.	V.
Rice, Levi.	Lime, spreading, &c.	I.
Richardson, J. S.	Door, springs for shutting.	II.
Rice, Phineas G. & Gabriel.	Hemp, hatcheling.	III.
Ripley, Charles.	Lead, carbonate of.	IV.
Richardson, James.	Cooking stove.	V.
Rice, Levi.	Horse-power.	XIII.
Rice & Cogden.	Horse-power.	XIII.
Ripley, Ezra.	Binder of newspapers.	XVIII.
Robinson, E. & G. W.	Knobs, glass, metallic, &c.	II.
Ropes, David N.	Latch, mortise.	II.
Robinson, Edward M.	Composition, protecting metallic, &c.	IV.
Roath, H. R.	Stoves, construction of.	V.
Rowe, James.	Car and circular railroad.	X.
Rust, Samuel.	Lamps.	V.
Rust, Samuel.	Lamps.	V.
Rust, Samuel.	Lamps, patent.	V.
Rush, James J.	Boilers, steam.	VI.
Ruggles, John.	Railroad, rails for.	IX.
Sampson, Daniel.	Oil cloth, drying.	III.
Sargent, Zebulon.	Shingles, sawing.	XIV.
Salisbury, Richard.	Truss for hernia.	XX.

Alphabetical list of persons, &c.—Continued.

Patentees.	Inventions or discoveries.	Class.
Sellers, Geo. E.	Furnace, smelting ore	II.
Severence, Levi	Rivet making	II.
Sherwood, Benjamin	Fire-proof safe	II.
Shanher, Christian W.	Loom	III.
Sheppard, Forrest	Paint, white, water color	IV.
Sherman, R. M.	Fire-place and grate, open	V.
Short, Sewall	Ovens, railway	V.
Sherman, Roger M.	Steam engine, rotary	VI.
Shailer, Reuben	Hides, scraping	XVI.
Sheets, Henry	Saddle, spring	XVI.
Sherman, Amos	Tailoring, system of	XXI.
Silliman, Henry	Straw, cutting	I.
Silsbee, John	Furnace, heated air to	V.
Skinner, Elijah	Cooking stove	V.
Skinner, Joseph	Veneers, cutting	XIV.
Sloat & Springsteen	Screws, cutting wood	II.
Smith, Francis H.	Lime, spreading	I.
Smith, John C.	Plough	I.
Smith, Benjamin M.	Smut machine	I.
Smith, Stephen C.	India rubber, manufacture of	IV.
Smith, Henry	Horse-power	XIII.
Smith, Jesse J.	Staves, sawing, for barrels	XIV.
Smith, Hiram M.	Tobacco, spinning	XXII.
Snider, Isaac	Plough	I.
Sorel, M.	Preserving iron from rust	IV.
Spratley, Benjamin	Cooking stove and galley	V.
Sperry, Ebenezer B.	Wind-wheel	XI.
Staub, Henry	Smut machine and garlic	I.
Stephens, John	Gin, cotton	III.
Stephens, Henry	Coloring matter, &c.	IV.
Stillwell, Daniel E.	Soap, making	IV.
Stillman, Wm. B.	Pump, air, for steam engines	VI.
Stimpson, James	Spark-catcher, centrifugal, &c.	VI.
Stevens, Jonathan	Pump, suction and force	XI.
Stanton, Nehemiah P.	Water wheel	XI.
Staub, Isaac	Wheel-band, mode of hanging	XIII.
Steiner, Matthias	Trunks, valises, &c.	XVI.
Stebbins, Lucius	Coloring maps, process, &c.	XVIII.
Swazy, Benjamin	Napping cloth	III.
Swainson, Jno.	Pistols, metallic, for steam, &c.	VI.
Swett, Samuel, jr.	Feathers, dressing and cleaning	XVII.
Tabor, Bartholomew W.	Stove, heating irons for tailors	V.
Thorp, Thomas	Door springs	II.
Thorpe, Comfort B.	Loom shuttle tongue	III.
Thomas, John	Dock, floating, dry	IX.
Thistle, Hezekiah L.	Saddles for removing the sick	XVI.
Thompson, Robert	Bandages, pads	XX.
Titcombe, Edgar M.	Spinning woollen roving	III.
Tompkins, James	Wheel hubs, boring, &c.	X.
Town, Elisha	Wheels of locomotives, &c.	X.
Tracy, Erastus	Wool, cleaning burs from	III.
Tuck, Joseph H.	Candles, moulding	IV.
Turner, Jonathan S.	Bodkin, &c.	XXI.
Twiss, Hiram	Coffee mill	XIII.
Uter, Samuel	Cooking stove	V.
Van Dusen, Washington	Propelling paddles used as ice-breakers	VII.
Van Winkle, Jesse	Boots, crimping leather for	XVI.
Von Shoulitz, N. S.	Salt water, purifying	IV.
Warren, John	Flax and hemp breaking	II.
Warner, C. A., T. Mixell, and Edwin J. Horn	Flax and hemp breaking	III.
Warner, Ebenezer C.	Cement, hydraulic, from basanite	IV.

Alphabetical list of persons, &c.—Continued.

Patentees.	Inventions or discoveries.	Class.
Walker, Nathaniel.....	Cooking stove.....	V.
Warner, Chapman.....	Water-wheel, horizontal.....	XI.
Washington, James H.....	Press, tobacco.....	XII.
Watterman & Learned.....	Brick moulding, &c.....	XV.
Waterman, Henry.....	Brick press.....	XV.
Ward, Allen.....	Garments, draughting fore part of coats...	XXI.
Wells, H. A., J. James, and R. W. Peck.....	Hat bodies.....	III.
Wells & Peck.....	Hat bodies, batting or web for.....	III.
West, Thomas J.....	Railroad, road stops for.....	XIX.
Whitney, Asa.....	Iron, carbonating and smelting.....	II.
Whitehouse, Turner.....	Lock, door.....	II.
Whitemore, James M.....	Boilers, steam.....	VI.
White, Sullivan.....	Press, cheese.....	XII.
Whitney, Samuel.....	Planing boards, &c.....	XIV.
Whittier, Otis W.....	Fire-arms, many-chambered, &c.....	XIX.
Williams, Palmer.....	Screws of screw bedsteads.....	II.
Wilson, James.....	Cooking stove.....	V.
Wilson, Carrington, jr.....	Cooking stove.....	V.
Wilcox, Philip.....	Cooking stove, heating.....	V.
Wilcox, Philip.....	Stoves, heating apartments.....	V.
Winans, Ross.....	Heating water for steam engines.....	VI.
Williamson, John.....	Pistons, packing.....	VI.
Winans, Ross.....	Steam engine, locomotive.....	VI.
Winans, Ross.....	Steam engine, locomotive.....	VI.
Winans, Ross.....	Steam engine, blowing fire.....	VI.
Winans, Ross.....	Steam engine, framing.....	VI.
Wilson & Beckwith.....	Capstans for ships, &c.....	VII.
Wing, Warren P.....	Water-wheel, current.....	XI.
Wilbur, Geo.....	Elevating hay.....	XII.
Wilbur, Apollos.....	Shingles, sawing.....	XIV.
Wilson, Robert.....	Saddle, spring seat, riding.....	XVI.
Wiswell, Andrew.....	Garments, cutting.....	XXI.
Woodcock, Bancroft.....	Plough.....	I.
Wolcott & Brown.....	Wool, cleaning.....	III.
Wood, Benjamin H.....	Cooking stove.....	V.
Woodward, Moses S.....	Boots, crimping leather for.....	XVI.
Wright, Samuel.....	Steam engine, locomotive.....	VI.
Wyman, Oliver.....	Grist mill.....	XIII.
Wyeth, Nathaniel J.....	Ice, preparing for shipping.....	XXII.
Young & Titus.....	Shoes, horse.....	II.

V.—CLASSIFIED LIST OF PATENTS GRANTED DURING THE YEAR 1851, WITH THE NAMES OF PATENTEES, PLACE OF RESIDENCE, AND DATE OF PATENTS.

CLASS I.—*Agriculture, including instruments and operations.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bee hives, construction of.....	A. J. Surles.....	Florence, Ga.....	Mar. 18, 1851.
Bee hives, use of slides in.....	Nathaniel Potter.....	Buffalo, N. Y.....	Mar. 11, 1851.
Broom corn, machines for assorting.....	Lorenzo D. Grosvenor.....	Shaker Village, Mass.....	Jan. 1, 1851.
Broom corn, machines for stripping seed from.....	L. D. Grosvenor.....	South Groton, Mass.....	Sept. 23, 1851.
Churns.....	Daniel Fisher.....	College Corner, Ohio.....	Jan. 1, 1851.
Churns.....	Ithiel S. Richardson.....	Boston, Mass.....	June 10, 1851.
Churns.....	Davis Dutcher.....	Springfield, N. Y.....	June 10, 1851; ante- dated 15th Feb., 1851.
Churns.....	Samuel G. Dogdale.....	Richmond, Ind.....	July 15, 1851.
Churns.....	George B. Clark.....	Leonardsville, N. Y.....	Sept. 23, 1851.
Churns.....	Henry Skinner.....	Attica, Wyoming co., N. Y.....	Dec. 16, 1851.
Churn and butter worker.....	A. Willard.....	Boston, Mass.....	Sept. 23, 1851.
Cultivators.....	Isaac Constant.....	Buffalo, Hart Grove, Sangamon co., Ill.....	Nov. 4, 1851.
Grain selves.....	Thomas B. Wheeler.....	Albany, N. Y.....	Dec. 16, 1851.
Grain separators and fans.....	Roswell T. Merrill.....	Bloomfield, Mich.....	April 8, 1851.
Grain threshing and separating.....	Cyrus Roberts and John Cox.....	Belleville, St. Clair co., Ill.....	Oct. 28, 1851.
Harvesters, mowing machines, and.....	J. H. Manny.....	Waddam's Grove, Stephenson co., Ill.....	Sept. 23, 1851.
Harvesters, grass.....	Edward Neely.....	Savannah, Mo.....	Jan. 7, 1851.
Harvesters, grain.....	Sidney S. Hurlbut.....	Racine, Wis.....	Feb. 4, 1851.
Harvesters, grain.....	Nicholas F. Allen.....	Ludlowville, N. Y.....	June 10, 1851.
Harvesters, grain.....	William H. Start.....	Smymna, Kent co., Del.....	June 24, 1851.
Harvesters, grain.....	A. Palmer and S. G. Williams.....	Brockport, N. Y.....	July 1, 1851.
Harvesters, grain and binders.....	William Watson.....	Chicago, Ill.....	May 13, 1851.
Harvesting machines.....	William Jones.....	Bradford, Vt.....	July 8, 1851.
Harvesting machines, rakes to.....	William H. Seymour.....	Brockport, N. Y.....	July 8, 1851.
Harvesting machines, rakes to.....	Sylvanus Miller.....	Urbanna, Ohio.....	July 15, 1851.
Harrows, rotary.....	Jona. F. Ostrander, assignor to A. B. & C. E. Hutchinson.....	New York, N. Y.....	Aug. 26, 1851.
Hullers, rice.....	Peter McKinlay.....	Charleston, S. C.....	April 1, 1851.
Ox yokes.....	Andrew L. Simpson.....	Durham, N. H.....	Jan. 7, 1851.
Planters, seed.....	James P. Ross.....	Lewisburg, Penn.....	Jan. 1, 1851.
Planters, seed.....	Archibald Wieting.....	Middletown, Penn.....	April 1, 1851.
Planters, seed.....	Jacob Barnhill.....	Circleville, Ohio.....	May 27, 1851.

V.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Planters, seed.....	David Horner.....	Union, Knox co., Ohio.....	July 29, 1851.
Planters, seed.....	Myron Cory.....	Jerseyville, Jersey co., Ill.....	Oct. 28, 1851.
Planters, seed.....	N. Foster, G. Jessup, H. L. Brown, and C. P. Brown.....	Palmyra, Wayne co., N. Y.....	Nov. 4, 1851.
Planters, seed.....	Wm. Redick.....	Uniontown, Penn.....	Nov. 18, 1851.
Planter, seed, devices for sewing in a.....	Wm. P. Clements.....	Ellersly, Harris co., Ga.....	Oct. 7, 1851.
Planters, seed, gearing of.....	Marshal J. Hunt.....	Rising Sun, Md.....	June 3, 1851.
Planter, seed, seeding apparatus of a.....	Samuel and Merton Pennock.....	Kennet Square, Penn.....	Feb. 11, 1851.
Planters, seed, seed distributors of.....	David and Herman Wolf.....	Lebanon, Pa.....	June 3, 1851.
Planter, seed, the seeding apparatus of a.....	Cornelius C. Van Every.....	Victor, Ontario co., N. Y.....	Oct. 21, 1851.
Ploughs.....	John Cooper, admr. of Benj. Yiger.....	Springfield, Ill.....	June 24, 1851.
Ploughs.....	Henry Goldson.....	Greensboro', Miss.....	Nov. 18, 1851.
Ploughs.....	Elijah Goldthait.....	Fort Wayne, Ind.....	Nov. 25, 1851.
Ploughs, adjustable land sides of.....	George Hefley, Samuel Conrad, and James Wigle.....	Berlin, Penn.....	Mar. 25, 1851.
Plough-stock, convertible.....	E. T. Parker.....	Berkley, Ala.....	Jan. 21, 1851.
Ploughs, wheeled, cultivating.....	G. W. C. Gillespie.....	Burlington, Des Moines, Iowa.....	Sept. 9, 1851.
Potato diggers.....	Daniel D. Bell.....	Wawarsing, Ulster co., N. Y.....	Dec. 9, 1851.
Scythe fastenings.....	Ebenezer G. Lamson.....	Shelburn, Mass.....	Mar. 18, 1851.
Scythe fastenings.....	Oliver Clark.....	Medina, Ohio.....	Mar. 18, 1851.
Scythe fastenings.....	Nathaniel Lamson.....	Shelburn Falls, Mass.....	Mar. 25, 1851.
Scythe fastenings.....	Nathaniel Lamson.....	Shelburn Falls, Mass.....	Mar. 25, 1851.
Scythe fastenings.....	David Anthony.....	Springport, N. Y.....	Nov. 11, 1851.
Scythes, the construction of.....	E. S. Clapp.....	Montague, Mass.....	Mar. 18, 1851.
Scythes, to the snath, fastenings of.....	Samuel & M. Pennock.....	Kennet's Square, Penn.....	July 8, 1851.
Seeding machines.....	T. F. Wingo.....	McLennorsville, Tenn.....	April 22, 1851.
Straw-cutters.....	Jonathan Sullivan.....	Lexington, N. C.....	May 13, 1851.
Straw-cutters.....	Jesse White.....	Barnsville, Ohio.....	April 1, 1851.
Wheat fans.....	Jehu Hollingsworth.....	Zanesville, Ohio.....	April 1, 1851.
Wheat fans.....	Jonathan L. Booth.....	Cuyahoga Falls, Ohio.....	April 8, 1851.
Winnowing machines.....	Oliver Etner.....	Shirley, Pa.....	April 29, 1851.
Winnowing machines, screens of.....	Jonathan Bean.....	Montville, Waldo county, Maine.....	Nov. 11, 1851.
Winnowers and separators, grain.....	Augustus B. Childs.....	Rochester, N. Y.....	Aug. 5, 1851.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Blind and shutter operator	Noah W. Speers.....	Cincinnati, Ohio.....	Dec. 16, 1851.
Blind slats, apparatus for operating.....	Samuel Avery.....	Phenix, N. Y.....	April 15, 1851.
Bolt-heading machines.....	Nathan Starks.....	Albany, N. Y.....	Dec. 23, 1851.
Cans or canisters, tops of.....	Alfred Bliss.....	Newark, N. J.....	Oct. 21, 1851.
Casting the backs upon the teeth of curry combs, method of.....	James M. Gardner.....	Troy, N. Y.....	Mar. 18, 1851.
Curry combs, construction of.....	William Wheeler.....	Troy, N. Y.....	Oct. 28, 1851.
Cut nail machine.....	John P. Sherwood.....	Fort Edward, Washington co., N. Y.....	Aug. 26, 1851.
Designs in sheet metal, apparatus for punching.....	William T. Rudd.....	Amsterdam, Bottenhout co., Va.....	July 8, 1851.
Dies, construction of.....	Hiram W. Hayden.....	Waterbury, Conn.....	June 17, 1851.
Door knobs, manufacture of.....	Orrin Newton.....	Pittsburg, Pa.....	Nov. 25, 1851.
Doors or shutters, attachment for opening or closing.....	William Post.....	Flushing, N. Y.....	Feb. 18, 1851.
Drill, hand.....	William Bushnell.....	New York, N. Y.....	Dec. 2, 1851.
Fasteners, blind or shutter.....	Washburn Race.....	Seneca Falls, N. Y.....	Sept. 23, 1851.
Files, machinery for cutting.....	John Crum.....	Ramapo, Rockland co., N. Y.....	July 1, 1851.
Foundry apparatus.....	Chapman Warner.....	Louisville, Ky.....	Dec. 2, 1851; Eng. pat. dated Oct. 5, 1849.
Furnaces employed in welding shanks to tools.....	Jonathan White.....	Antrim, Hillsborough, N. H.....	Oct. 14, 1851.
Furnace, revolving reverberatory.....	Ambrose S. Beadleston.....	Anable Forks, Essex co., N. Y.....	Dec. 9, 1851.
Gold amalgamator.....	William Ball.....	Chicopee, Hampden co., Mass.....	Sept. 9, 1851.
Hammers, trip, method of adjusting the stroke of.....	Luther Briggs, jr.....	Braintree, Mass.....	Mar. 11, 1851.
Hinge, crane, for doors, shutters, etc.....	Ezra Ripley.....	Troy, N. Y.....	May 13, 1851.
Hinge, double-acting spring.....	Theodore F. Engelbrecht.....	New York, N. Y.....	Feb. 25, 1851.
Hinges, spring.....	Harvey W. Sabin and George Drew.....	Canandaigua, N. Y.....	Feb. 25, 1851.
Hooker-up, mechanical.....	David J. Hapsett.....	Downingtown, Chester co., Pa.....	July 8, 1851.
Horse shoe machine.....	Robert G. Babcock.....	New London, Conn.....	Apr. 29, 1851; antedated Feb. 24, 1851.
Iron, glazed sheet, process of manufacturing.....	John and Wm. W. Wood.....	Conshohocken, Pa.....	April 15, 1851.
Iron, manufacture of.....	S. T. Jones.....	New York, N. Y.....	Sept. 16, 1851; Eng. pat. dated July 23, 1850.
Iron, measuring and cutting.....	Levi B. Griffith.....	Honeybrook, Pa.....	Nov. 4, 1851.
Iron, wrought, direct from the ore, apparatus for making.....	James Renton.....	Newark, N. J.....	Dec. 23, 1851.

V.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Jackchains, tools for making	William Todd, assignor to Charles Atwood and George Kellogg	Stanford, Conn.; Derby, Conn.	April 8, 1851.
Kettles, and articles of like character, from disks of metal, machinery for making	Hiram W. Hayden	Waterbury, New Haven co., Conn.	Dec. 16, 1851.
Kettles with spouts, method of moulding	Webster H. Pease	Dayton, Montgomery co., Ohio	Oct. 28, 1851.
Key, swivel-nibbed	James Hanly	New York, N. Y.	Jan. 28, 1851.
Lead machines, sheet, combination of dies for ..	John Robertson	New York, N. Y.	May 27, 1851.
Lock, bank, powder proof	William Hall	Boston, Mass.	July 29, 1851.
Locks, chronometric	William L. Bass	Boston, Mass.	Dec. 23, 1851.
Locks, door	Charles H. Beatty	Wheeling, Va.	Oct. 14, 1851.
Lock for safes, &c.	F. C. Goffin, assignor to Charles J. Gayler ..	New York, N. Y.	Dec. 2, 1851.
Locks, key	Jas. R. Bugbee, assignor to Jas. R. Bugbee and Enoch Robinson ..	Boston, Mass.	April 22, 1851.
Locks, key	Linus Yale, jr.	Newport, N. Y.	May 6, 1851.
Lock, maze	Thomas Nicholson	Falmouth, Stafford co., Va.	Sept. 30, 1851.
Lock on sheet metal, machine for forming	Jabez Walker	East Bloomfield, N. Y.	April 1, 1851.
Locks, permutation safety	Robert Newell	New York, N. Y.	June 10, 1851; in England April 15, 1851.
Locks, rotating tumbler	David H. Richards & Jos. H. Flanders ..	Newburyport, Mass.	Dec. 16, 1851.
Metal tubes, method of liberating, from forming mandrel	Job Cutler	Birmingham, England.	July 29, 1851; English patent Feb. 28, 1849.
Milling tool	John Buckingham and Jos. H. Baird, ass'ts to Scovill Manufacturing Co.	Watertown, Conn.; Waterbury, Conn.	April 15, 1851.
Nail machine, horse shoe	Daniel Wilson, jr., assignor to D. Wilson, jr., and H. M. Bird	North Chelmsford, Mass.	Jan. 21, 1851.
Nail machine, horse shoe	Marshall Barnett	Boston, Mass.	April 1, 1851.
Nut and washer machine	Henry Carter and James Rees	Pittsburg, Penn.	Aug. 26, 1851.
Nuts, washers, &c., machines for making	Wm. Kenyon, assignor to Joseph P. Haight, A. Hartupee, and J. Morrow	Steubenville, Ohio	Oct. 14, 1851.
Ores, copper, process for smelting	Samuel F. Tracy	New York, N. Y.	Dec. 16, 1851.
Ores, minerals, &c., arrangement of pans for washing	Samuel Porter	Hartford, Conn.	Dec. 9, 1851.

Ores, process of reducing by zinc, compounds.....	E. S. Seymour.....	Williamsburg, N. Y.....	Aug. 26, 1851.
Ore washer.....	Arnold Bufum.....	Brooklyn, N. Y.....	Oct. 21, 1851.
Padlock.....	Geo. McGregor, Robert Lee, and Thos. G. Clinton.....	Cincinnati, Ohio.....	Aug. 26, 1851.
Padlock.....	David Tilton, assignor to Tilton and Smetzer.....	Stoneham, Mass.....	Aug. 26, 1851.
Padlock.....	Thomas Slaight.....	Newark, N. J.....	Oct. 14, 1851.
Patterns, metal and second for castings.....	Francis N. Still.....	New York, N. Y.....	Jan. 28, 1851.
Pins, machine for sticking on paper.....	Chauncy O. Crosby.....	New Haven, Conn.....	April 1, 1851.
Pins, mode of papering.....	C. O. Crosby.....	New Haven, Conn.....	July 8, 1851.
Pins, mode of papering.....	C. O. Crosby.....	New Haven, Conn.....	Dec. 2, 1851.
Rods, tapered metallic, apparatus for rolling.....	William Clay.....	Clifton Lodge, England.....	April 22, 1851; in England Dec. 16, 1848.
Safes, fire-proof.....	Louis Lillie, assignor to Jno. W. Bates.....	Troy, N. Y.....	July 15, 1851.
Sash lock.....	Michael Norton.....	Cambridge, Mass.....	Mar. 25, 1851.
Sash stopper.....	Joseph Osbourne.....	Weymouth, Mass.....	June 3, 1851.
Sash, upper, arrangement of catches in, operated by moving the lower sash.....	W. Race.....	Seneca Falls, N. Y.....	July 1, 1851.
Sashes, window, method of hanging.....	Samuel D. Nims.....	Palmer, Hampden co., Mass.....	Dec. 23, 1851.
Screw blanks, machine for arranging and feeding.....	Thomas J. Sloan.....	New York, N. Y.....	Feb. 25, 1851.
Screw blanks, &c., machine for assorting.....	Thomas J. Sloan.....	New York, N. Y.....	May 6, 1849.
Screw blanks and articles of a similar character, machine for arranging.....	Thomas J. Sloan.....	New York, N. Y.....	Sept. 30, 1851.
Screws, machinery for shaving, nicking and re-shaving wood.....	Thomas J. Sloan.....	New York, N. Y.....	Oct. 21, 1851.
Screws, machinery for threading wood, and feed apparatus therefor.....	Thomas J. Sloan.....	New York, N. Y.....	Sept. 23, 1851.
Screws, method of finishing the heads of.....	Thomas J. Sloan.....	New York, N. Y.....	June 10, 1851.
Screws and pins, machines for counting.....	Thomas J. Sloan.....	New York, N. Y.....	Dec. 23, 1851.
Shutters, apparatus for securing, in any required position.....	Charles W. Krebs.....	Baltimore, Md.....	Mar. 25, 1851.
Shutters, &c., apparatus for moving and securing.....	N. W. Speers.....	Cincinnati, Ohio.....	Mar. 25, 1851.
Spike machines, gauging and heading movement for.....	Pamel Jefferson.....	Bridgeton, N. J.....	May 20, 1851.
Spike machines.....	Mark M. Ison.....	Etowa, Cass co., Ga.....	Aug. 12, 1851.
Spike machine, hook heading motion for.....	James H. Jewett.....	Concord, N. H.....	Aug. 26, 1851.
Spoons, &c., manufacture of wire, strengthened... ..	Moore Harlaway.....	Troy, N. Y.....	Sept. 9, 1851.
Spring bolt.....	Luther Boardman.....	East Haddam, Conn.....	May 20, 1851.
Spring, machinery for forming joints of, elliptical.....	Oliver H. Bush.....	Fall River, Bristol co., Mass.....	Aug. 5, 1851.
Swaging machine, rotary.....	Wm. T. Richards.....	New Haven, Conn.....	Aug. 26, 1851.
	Perry G. Gardner.....	New York, N. Y.....	Dec. 23, 1851.

V.—Classified list of patents, &c.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Tuyers, by continuous rolling, machinery for making.....	Joseph Dorwart.....	Morgantown, Pa.....	Jan. 14, 1851.
Tuyers, tight joint for.....	P. G. Gardner.....	New York, N. Y.....	Mar. 11, 1851.
Vaults, sars, &c., compound metallic doors for.....	William Graham.....	Carlisle, Penn.....	Aug. 5, 1851.
Vice, bench.....	Ira L. Cady.....	New York, N. Y.....	April 29, 1851.
Vice, parallel.....	N. F. Cone.....	Kingsville, Ashtabula co., Ohio.....	Sept. 16, 1851.
Wheel tires, machine for making.....	Samuel R. Simpson.....	Springfield, Ohio.....	Jan. 7, 1851.
	Maria Vaughn, assignor to James C. Bell and Robert Christie, jr.....	Greenbush, Rensselaer co., N. Y.....	Sept. 30, 1851.

CLASS III.—Manufacture of fibrous and textile substances, including machine for preparing fibres of wood, cotton, silk, fur, paper, &c.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bats for felting, making.....	Leander W. Boynton.....	South Coventry, Conn.....	April 29, 1851.
Bats for felt cloth, &c., crossing the fibres in forming.....	Alonzo C. Arnold.....	Norwalk, Conn.....	June 10, 1851.
Card grinders.....	R. Kitson.....	Lowell, Mass.....	Nov. 11, 1851.
Cloth folding machine.....	D. R. Ambrose and O. S. Reynolds.....	Portsmouth and Dover N. H.....	July 23, 1852.
Cloth, machine for folding and measuring.....	Henry Boot.....	New Bedford, Mass.....	April 1, 1851.
Cloth, machine for stretching and drying.....	Thomas Barrows.....	Dedham, Norfolk co., Mass.....	Dec. 2, 1851.
Cords, coupling for.....	Lawton J. Ware.....	Warren, R. I.....	May 20, 1851.
Cotton duck, dressing.....	Horatio N. Gambrell.....	Baltimore, Md.....	Oct. 21, 1851.
Fibre, vegetable, processes for treating.....	Peter Clausen.....	Blackfriars, England.....	June 3, 1851; in England, August 16, 1850.
Flock, machine for grinding.....	John C. Fonda.....	Albany, N. Y.....	July 24, 1851.
Flocks, machine for opening and cleaning.....	Ephraim C. Brett.....	Great Barington, Berkshire co., Mass.....	Oct. 7, 1851.
Flocks to cloth, apparatus for applying.....	D. and R. Pratt.....	Elmira, N. Y.....	Oct. 7, 1851.

running Vegetable and "outer textures," chemical process for.....

Hemp brakes.....
Hemp, &c., machines for dressing Sisal.....
Hemp and flax, machines for breaking and reducing the length of the fibres.....
Hemp and flax, machine for scutching and hackling.....
Hemp, manufacture of, from okra.....
Jacquard machines.....
Knitting machines.....

Knitting machines.....
Knitting machines.....
Knitting machines.....
Looms, cylinders for figuring.....
Looms for weaving bags.....

Looms for weaving cut pile fabrics.....
Looms for weaving piled fabrics.....
Looms for weaving piled fabrics.....
Looms for weaving seamless bags.....
Looms for weaving tapestry carpets with parti-colored warp.....
Looms, hand.....
Looms, Jacquard, for weaving cut pile fabrics.....
Looms, power, fancy check.....
Looms, shuttle, motions of.....
Looms, shuttle, motions of.....
Paper moulds.....

Pulp screws.....
Sewing machines.....
Sewing machines.....
Sewing machines.....

John Mercer.....	Oakenshaw, Lancaster co., England....	Aug. 19, 1851; in England and Oct. 24, 1850.
Paris M. Walker.....	Marshall, Mo.....	May 27, 1851.
S. A. Clements.....	Springfield, Hampden co., Mass.....	July 15, 1851.
Jas. S. Treat and Stephen Randall.....	Voluntown, Windham co., Conn.....	Sep. 16, 1851.
Owen W. Grimes.....	Paducah, Ky.....	Sep. 23, 1851.
John Blanc.....	New Orleans, La.....	June 24, 1851.
John Scott and John Tannabill.....	Philadelphia, Pa.....	Mar. 18, 1851.
John Pepper, assignor to Charles Warren and H. G. Sanford.....	Portsmouth, N. H., and Boston, Mass..	Feb. 25, 1851; antedated Aug. 25, 1850.
Rufus Ellis, assignor to W. M. Chase.....	Boston, Mass.....	July 17, 1851.
John H. Barsantie.....	Portsmouth, N. H.....	June 29, 1851.
John Pepper, assignor to Hosea Crane, John Pepper and J. G. Crane.....	Portsmouth, N. H.....	June 24, 1851.
Eliakin M. Hastings and John Shepherdson.....	Jamestown, N. Y.....	Mar. 18, 1851.
Cyrus Baldwin, assignor to "Stark Mills".....	Manchester, N. H.....	Dec. 2, 1851; antedated Aug. 30, 1851.
M. C. Bryant.....	Lowell, Mass.....	Aug. 5, 1851.
Erastus B. Bigelow.....	Clinton, Mass.....	Jan. 14, 1851.
John Johnson, assignor to E. Johnson. Sheldon Northrop.....	Troy, N. Y.....	Aug. 5, 1851.
Erastus B. Bigelow.....	New Milford, Conn.....	Jan. 1, 1851.
Isaac H. Garretson.....	Clintonville, Mass.....	Jan. 7, 1851.
Erastus B. Bigelow.....	Clay, Iowa.....	Feb. 16, 1851.
Ezech Burt.....	Clinton, Mass.....	Mar. 18, 1851.
George W. Perry.....	Manchester, Conn.....	Feb. 4, 1851.
George J. Wardwell.....	Thompson, Windham co., Conn.....	Nov. 11, 1851.
William Brewer and John Smith.....	Hanover, Oxford co., Maine.....	Aug. 5, 1851.
Geo. West.....	Malcome place, Clapham, Eng; Southville, South Lambeth, England.....	Mar. 4, 1851; in England, Feb. 12, 1849.
William O. Grover and W. E. Baker.....	Tyringham, Mass.....	Aug. 19, 1851.
W. H. Aikins and J. D. Felthousen.....	Boston, Mass.; Roxbury, Mass.....	Feb. 11, 1851.
Isaac M. Singer.....	Ithaca, N. Y.....	Aug. 5, 1851.
	New York, N. Y.....	Aug. 12, 1851.

V.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Sewing machines.....	Allen B. Wilson.....	Watertown, Litchfield co., Conn.....	Aug. 12, 1851.
Shawls, &c., machines for twisting fringes of.....	Jno. Nesmith and Wesley Sawycr.....	Lowell, Mass.....	Oct. 14, 1851.
Spinning machines, drawing regulators for.....	Newell Wyllis.....	South Glastenbury, Conn.....	Jan. 28, 1851.
Spinning rope yarns.....	Richard S. Tucker.....	Brooklyn, N. Y.....	Dec. 23, 1851.
Spinning wool, hand machines for.....	Margaret Hulings.....	Randolph co., Ind.....	June 3, 1851.
Waste pickers.....	Chas. G. Sargent and Rob. Thompson.....	Lowell, Mass.....	Sept. 16, 1851.
Weaving, delivering parti-colored warps in.....	Erastus B. Bigelow.....	Clinton, Mass.....	Mar. 18, 1851.
Weavers' headdles.....	Charles T. Judkins.....	Lowell, Mass.; patented in England to David Christie.....	Feb. 18, 1851; in England, Feb. 10, 1849.
Weavers' temples.....	A. Jilison.....	Woonsocket, R. I.....	Sep. 16, 1851.
Weavers' shuttles.....	Leroy Litchfield.....	Southbridge, Worcester co., Mass.....	Sep. 30, 1851.
Woven fabrics, wires for making pile in.....	E. B. Bigelow.....	Clinton, Mass.....	Nov. 25, 1851.
Weavers' temples.....	E. and W. W. Dutcher.....	North Bennington, Vt.....	Dec. 16, 1851.
Wool, machines for cleansing.....	Leander W. Boynton.....	South Coventry, Ct.....	Aug. 12, 1851.
Yarns, sizing and dyeing apparatus for.....	Alorzo Bascom.....	East Jaffrey, Cheshire co., N. H.....	Nov. 18, 1851.

CLASS IV.—*Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Acid and naphtha from rosin.....	L. S. Robins.....	New York, N. Y.....	Nov. 4, 1851.
Alloys of iron, zinc and nickel.....	Otis Boyden.....	Newark, N. J.....	May 27, 1851.
Bronze powder, processes of making.....	L. Brander.....	New York, N. Y.....	Sep. 16, 1851.
Calico printing, material for transferring colors in.....	Charles A. Broquette.....	France.....	April 15, 1851; France, April 1, 1849.
Cane juice, machine for expressing.....	Henry Bessemer.....	Middlesex co., England.....	June 3, 1851; in Ireland, Dec. 31, 1850.
Candle making, apparatus for.....	Willis Humiston.....	Troy, N. Y.....	Dec. 23, 1851.

Caviar, manufacture of.....	Rob. G. Westcott, assignor to West-	Jan. 7, 1851.
Cements, for grinding, cylinders.....	accott, Lombard & Lombard	Worcester, Mass.; Boston, Mass.....
Compounds, lubricating.....	Jacob Stephan, assignor to P. Augustus	Boston, Mass.....
Drying and oxydizing colored goods.....	Swaze and Jacob Stephan.....	Pottsville, Pa.....
Dyeing blue, processes for.....	Jacob Selgrath.....	Manyunk, Philadelphia co, Pa.....
Dyeing door mats.....	James C. Kempton.....	Andover, Mass.....
Gas, illuminating, purifying.....	Edward Swiney.....	Madison, New Haven, Conn.....
Gutta percha hollow ware.....	Reuben Shaler.....	Paris, France.....
Gutta percha, tubing and covering wire, ma-	Florentine J. de Cavailon.....	New York, N. Y.....
chines for.....	Samuel T. Armstrong.....	New York, N. Y.....
India rubber, manufacture of.....	James Reynolds.....	New York, N. Y.....
India rubber, manufacture of.....	Jonathan T. Trotter.....	Newark, N. J.....
India rubber, manufacture of.....	David McCurdy.....	New York, N. Y.....
Mashing tubs.....	Nelson Goodyear.....	Waterloo, Seneca co, N. Y.....
Oil from rosin, lubricating.....	Joseph Wright.....	New York, N. Y.....
Oil from rosin, tanners'.....	L. S. Robins.....	New York, N. Y.....
Paint, manufacture of.....	L. S. Robins.....	New York, N. Y.....
	G. F. de Douchet.....	Paris, France.....
Paint, metallic alloy.....	Chas. Wetterstedt, assignor to Chas.	Marseilles, France; New York, N. Y....
	Kenan.....	New York, N. Y.....
Paint oil from rosin.....	L. S. Robins.....	New Haven, Conn.....
Peppermint droppers.....	Henry H. Snow.....	Scott's house, England.....
Pigments, manufacture of.....	H. L. Patinsson.....	New York, N. Y.....
Sugar, apparatus for draining.....	Smith Gardner.....	Poughkeepsie, N. Y.....
Sugar drainers, centrifugal.....	William Van Anden.....	Brooklyn, N. Y.....
Sugar drainers, centrifugal.....	Daniel King.....	New York, N. Y.....
Sugar vacuum pans.....	James M. Miller.....	Boston, Mass.....
Zinc, white, use of steam to make.....	Henry W. Adams.....	
		Aug. 5, 1851; Eng. pat-
		ent dated Nov. 3, 1846.
		Nov. 4, 1851.
		Mar. 4, 1851.
		Aug. 12, 1851; Eng. pat-
		ent dated Feb. 14, 1849.
		Sept. 16, 1851.
		June 10, 1851.
		Nov. 25, 1851.
		Oct. 21, 1851.
		Oct. 28, 1851.
		Sept. 9, 1851; English
		patent dated June 1,
		1850; French patent
		dated Oct. 5, 1850.

V.—Classified list of patents, &c.—Continued.

CLASS V.—Calorific, comprising lamps, fireplaces, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel, &c.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bagasse, machines for drying.....	Samuel H. Gilman.....	Cincinnati, Ohio.....	Oct. 28, 1851.
Candlesticks.....	James Manning.....	Middletown, Ct.....	Jan. 1, 1851.
Candlesticks.....	Francis A. Rockwell.....	Ridgefield, Fairfield co., Ct.....	Dec. 16, 1851.
Charcoal, manufacture of.....	W. P. McConnell.....	Washington, D. C.....	Nov. 4, 1851.
Chimney tops.....	Charles W. Russell.....	Washington, D. C.....	Dec. 16, 1851.
Dust, excluding from railroad cars.....	Ed. Hamilton, assignor to N. Goodyear.....	Bridgeport, Ct.; New York, N. Y.....	May 27, 1851.
Dwellings, apparatus for warming air and water for.....	L. C. St. John.....	Buffalo, N. Y.....	Oct. 7, 1851.
Fires, compound for extinguishing.....	Joshua Upham.....	Salem, Essex county, Mass.....	Nov. 4, 1851.
Fireplace, reflecting.....	Robert Jobson.....	Near Dudley, England.....	May 20, 1851; in England Dec. 28, 1848.
Fountain and evaporator combined.....	George H. Thatcher.....	Albany, N. Y.....	July 22, 1851.
Furnaces, hot-air.....	Samuel Pierce.....	Troy, N. Y.....	May 20, 1851.
Furnaces, hot-air.....	Joseph C. Treat.....	East Hartford, Ct.....	Aug. 5, 1851.
Furnaces, ventilating.....	Henry Ruttan.....	Coburg, Canada West.....	In Canada Jan. 31, 1851; in America May 20, '51.
Gas-burners, Argand.....	John G. Webb.....	Williamsburg, King's county, N. Y.....	Oct. 14, 1851.
Gas regulators.....	J. S. Conant.....	Lowell, Mass.....	Dec. 9, 1851.
Grate-bars, agitating.....	A. D. Spoor.....	Troy, N. Y.....	April 15, 1851.
Grates, stove.....	H. J. Ruggles.....	West Poutney, Vt.....	Nov. 18, 1851.
Grates, quadrant-hinged.....	George H. Thatcher.....	Albany, N. Y.....	Aug. 5, 1851.
Lamps for burning vapor of benzole, &c.....	Chapman Warner.....	Washington, D. C.....	Oct. 14, 1851.
Lamps, lard.....	Delamar Kinnear.....	Circleville, Ohio.....	Feb. 4, 1851.
Lamps, self-acting blow-pipes.....	D. W. C. McCloskey.....	New York, N. Y.....	Aug. 26, 1851.
Lamps, solar, for burning lard or oils.....	John G. Webb.....	Williamsburg, King's county, N. Y.....	Oct. 14, 1851.
Lamps, street, reflectors for.....	Hugh and James Sangster.....	Buffalo, N. Y.....	Jan. 14, 1851.
Lanterns.....	Henry and James Sangster.....	Buffalo, N. Y.....	June 10, 1851.
Ovens, portable, elevated.....	P. Killin.....	Mount Healthy, Ohio.....	Oct. 7, 1851.
Radiating surfaces.....	J. K. Ingalls.....	New York, N. Y.....	Nov. 4, 1851.
Ranges, cooking.....	Nicholas Mason.....	Roxbury, Mass.....	Aug. 19, 1851.
Ranges, cooking.....	Moses Pond.....	Boston, Mass.....	Feb. 25, 1851.

Steam traps.....	Charles M. Guild and John Brown....	New York, N. Y.....	May 20, 1851.
Stoves.....	George H. Thatcher.....	Albany, N. Y.....	Jan. 21, 1851.
Stoves.....	Elihu Smith.....	Albany, N. Y.....	Jan. 28, 1851.
Stoves.....	Gardner Chilson.....	Boston, Mass.....	Sept. 16, 1851.
Stoves.....	Elisha Vance.....	Cincinnati, Ohio.....	Oct. 14, 1851.
Stoves.....	Hale R. Rose.....	Guilford, Vt.....	Nov. 18, 1851.
Stoves, air-heating.....	Gorton Williston.....	Charlestown, Mass.....	Oct. 14, 1851.
Stoves, air-heating.....	Charles A. Bogart.....	West Dresden, Yates county, N. Y.....	Oct. 21, 1851.
Stoves, airtight, Franklin.....	Rensselaer D. Granger.....	Albany, N. Y.....	Mar. 11, 1851.
Stoves, coal.....	James Shields and Samuel Pierce.....	New York, N. Y.; Troy, N. Y.....	Jan. 7, 1851.
Stoves, cooking.....	Bachus A. Beardsley.....	Waterville, N. Y.....	Feb. 4, 1851.
Stoves, cooking.....	William Sours.....	Mount Jackson, Va.....	Feb. 25, 1851.
Stoves, cooking.....	James Green and Rufus J. King.....	Dayton, Ohio.....	Mar. 11, 1851.
Stoves, cooking.....	Rufus K. Paine.....	Cincinnati, Ohio.....	April 8, 1851.
Stoves, cooking.....	James J. Marsh.....	Lewisburg, Pa.....	April 15, 1851.
Stoves, cooking.....	Dennis J. Littlefield.....	Lowell, Mass.....	April 15, 1851.
Stoves, cooking.....	Charles W. Grannis.....	Gowanda, N. Y.....	April 22, 1851.
Stoves, cooking.....	Elias Young.....	Cincinnati, Ohio.....	June 17, 1851.
Stoves, cooking.....	Hosea H. Huntly.....	Cincinnati, Ohio.....	Aug. 19, 1851.
Stoves, cooking.....	Hosea H. Huntly.....	Cincinnati, Ohio.....	Nov. 25, 1851.
Stoves, cooking.....	George W. Carleton.....	Brunswick, Cumberland county, Me.....	Nov. 25, 1851.
Stoves, dairy.....	Joel Stevens & H. J. Rugles.....	West Poughkeepsie, Vt.....	Oct. 28, 1851.
Stoves, double oven.....	C. Harris & P. W. Zeiner.....	Cincinnati, Ohio.....	Sept. 2, 1851.
Stoves, folding doors of.....	James Root.....	Cincinnati, Ohio.....	Nov. 4, 1851.
Stoves, grate bars.....	George W. Gardner.....	Albany, N. Y.....	Nov. 18, 1851.
Stoves, parlor, cooking.....	N. A. Boynton.....	Boston, Mass.....	July 22, 1851.
Stoves, with portable ovens.....	George H. Thatcher.....	Albany, N. Y.....	July 29, 1851.
Ventilating and excluding dust from railroad cars.....	Ransom Cook.....	Saratoga Springs, N. Y.....	Aug. 19, 1851.
Ventilators.....	Thatcher C. Hatch.....	South Braintree, Mass.....	June 17, 1851.

V.—Classified list of patents, &c.—Continued.

CLASS VI.—Steam and gas engines, including boilers and furnaces therefor, and parts thereof.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Boilers, apparatus for steam.....	J. & J. J. G. Collins.....	Kensington, Pa.....	Nov. 25, 1851.
Boilers, &c., steam apparatus for indicating the height of water in.....	George Faber.....	Canton, O.....	May 13, 1851.
Boilers, method of tracing the water spaces of.....	Bernard O. Neill.....	Reading, Pa.....	March 4, 1851.
Boilers, revolving.....	Charles Anderson.....	Warren, Pa.....	June 17, 1851.
Boilers, revolving.....	William Scott.....	Rising Sun, Ohio co., Indiana.....	Oct. 7, 1851.
Boiler, steam, annular.....	Thomas Champion.....	Philadelphia, Pa.....	Feb. 18, 1851.
Boilers, steam, arrangement of the flues and water spaces of.....	William E. Milligan.....	New York, N. Y.....	July 15, 1851.
Boilers, steam, insulated fusible plug for.....	E. H. Ashcroft.....	Boston, Mass.....	Feb. 18, 1851.
Boilers, steam, water gauge for.....	A. S. Lyman.....	New York, N. Y.....	Aug. 12, 1851.
Boiler tubes, &c., spring expanding gauge for.....	James McCarty.....	Reading, Pa.....	July 29, 1851.
Crank indicator, arrangement of machinery for actuating the.....	Samuel B. Hutchins.....	Oswegatchie, N. Y.....	June 3, 1851.
Cut-off, adjustable.....	Samuel H. Gillman.....	Cincinnati, O.....	Mar. 18, 1851.
Cut-off, gear.....	George H. Corliss.....	Providence, R. I.....	July 29, 1851.
Cut-off, variable, regulated by the governor.....	Henry Waterman.....	New York, N. Y.....	Mar. 4, 1851.
Engine, air.....	John Ericsson.....	New York, N. Y.....	Nov. 4, 1851; in England, December 26th, 1850.
Engines, apparatus for regulating the speed of.....	H. A. Lutigens.....	New York, N. Y.....	Oct. 21, 1851.
Engines, carbonic acid gas.....	Jno. C. Fr. Salomon.....	Cincinnati, O.....	Dec. 9, 1851.
Engines, in which compressed air or other gas, heated and expanded by admixture therewith of a heated fluid, is used as the motive agent.....	Wm. Mt. Storm.....	Troy, Rensselaer co., N. Y.....	Sept. 23, 1851.
Engines, valve for oscillating.....	William M. Smith.....	Georgetown, D. C.....	Nov. 25, 1851.
Equalizers or power regulators.....	Alfred Gregory.....	Brooklyn, N. Y.....	Sept. 9, 1851.
Gauge for indicating pressure of steam, &c.....	George Faber.....	Canton, Stark co., Ohio.....	Sept. 16, 1851.
Indicator, water level, for steam boilers.....	Albert H. Judd.....	Marinetown, Ill.....	Aug. 5, 1851.

CLASS VII.—*Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Kilns, grain.....	J. S. Stover.....	Erwenna, Bucks co., Pa.....	Nov. 11, 1851.
Packing of rotary engines, method of adjusting the.....	Henry G. Thompson.....	New York, N. Y.....	Feb. 4, 1851.
Power, motive, method of obtaining.....	William M. Storm.....	Troy, N. Y.....	Feb. 4, 1851.
Spark-arresters.....	James A. Cutting.....	Philadelphia, Pa.....	May 6, 1851.
Steam engines.....	Rich'd. F. Loper & John W. Nystrom.	Philadelphia, Pa.....	April 15, 1851.
Steam engine, arrangement of the.....	Feder'ck P. Dimpfel.....	New York, N. Y.....	July 1, 1851.
Valves, balanced.....	Francis B. Stevens.....	New York, N. Y.....	Mar. 25, 1851.
Valve side, method of connecting the, with the rock-shaft.....	Samuel H. Gilman.....	Cincinnati, O.....	Jan. 1, 1851.
Boats to facilitate the discharge of cargo, and fittings for.....	William H. Bryan..... John R. St. John, assignor to James Renwick, Geo. T. Barnard, and E. B. St. John, trustees of the St. John Compass and Log Company.....	Georgetown, D. C.....	July 29, 1851.
Hand-log.....	A. A. Wilder..... Charles F. Brown..... Ambrose W. Thompson..... Gaspard Malo..... Charles Frederick Fisher..... John C. fr. Salomon.....	New York, N. Y..... Detroit, Michigan..... Warren, R. I..... Philadelphia, Pa..... Dunkirk, France..... New Orleans, La..... Cincinnati, O.....	May 6, 1851; in Europe Dec. 27, 1850. Jan. 21, 1851. June 17, 1851. Jan. 21, 1851. Nov. 18, 1851. Oct. 7, 1851. Dec. 2, 1851.
Lee-way indicator.....	Chandos Hoskins.....	New Orleans, La.....	May 13, 1851.
Masts and spars, telescopic connection of.....	Charles F. Brown.....	Warren, R. I.....	June 10, 1851.
Propeller.....	Thos. H. Mortimer & Jas. M. Gardner.	Charleston, S. C.....	Nov. 25, 1851; French patent dated Jan. 11, 1851.
Propeller screw.....			
Propeller, the endless chain.....			
Propelling and steering, apparatus for.....			
Rudder, apparatus for relieving the helmsman from the shock of.....			
Rudder, balanced.....			
Rudders, method of operating.....			

V.—*Classified list of patents, &c.*— Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Sails, method of making.....	Eli F. Southward.....	Wellsfleet, Mass.....	Sept. 9, 1851.
Ships, light.....	Leonard Goefrich.....	New York, N. Y.....	Feb. 4, 1851.
Ships, model, measurer.....	Abijah S. Hosley.....	New York, N. Y.....	Aug. 19, 1851.
Ships, ventilating.....	Amos J. Sexton and Wm. Ennis.....	Brooklyn, N. Y.; New York, N. Y.....	Sept. 23, 1851.
Ships' winches.....	Thomas G. Boone.....	Brooklyn, N. Y.....	Oct. 21, 1851.
Snatch-block.....	Philip Rhoades, jr.....	Pittsburg, Pa.....	Feb. 18, 1851.
Steering apparatus.....	Joseph E. Andrews.....	Boston, Mass.....	Jan. 14, 1851.
Velocimeters, aquatic, method of supporting the vanes of.	John R. St. John, assignor to James Renwick, Geo. T. Barnard, E. B. St. John, trustees of the St. John Compass and Log Company.	New York, N. Y.....	In Europe, Dec. 27, 1850; in U. States, May 13, 1851.
Vessels, flexible hose or float for supporting.....	Wm. Mt. Storms.....	Troy, N. Y.....	April 29, 1851.
Vessels, method of raising sunken.....	William Irwin.....	Philadelphia, Pa.....	Sept. 2, 1851.

CLASS VIII.—*Mathematical, philosophical, and optical instruments, including clocks, chronometers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Calculating interest, rules for.....	Sam. S. Young, ass'r to John R. Stephens	Eaton, Ohio.....	Sept. 2, 1851.
Calculating machines.....	John W. Nystrom.....	Philadelphia, Pa.....	Mar. 4, 1851.
Electro magnetic engines.....	Jacob Neff.....	Philadelphia, Pa.....	Jan. 7, 1851.
Electro magnetic engines.....	Thomas C. Avery.....	New York, N. Y.....	Feb. 25, 1851.
Electro magnetic telegraphs, circuit changes for.....	Charles S. Bulkeley.....	Macon, Bibb county, Georgia.....	Sept. 2, 1851.
Escapements for time pieces.....	James Fulton.....	Louisville, Kentucky.....	Oct. 7, 1851.
Lighting-rods, insulators for.....	George W. Ouis.....	Lynn, Essex county, Mass.....	Aug. 26, 1851.
Poles, machines for climbing.....	Henry D. Chapman.....	Baltimore, Md.....	Mar. 11, 1851.
Plotting scales.....	Lemuel H. Parsons.....	Lambertville, Hunterdon county, N. J.....	Sept. 30, 1851.
Spectacle frames.....	John P. Paine.....	Worcester, Mass.....	July 1, 1851.
Telegraph wires, insulators for.....	John M. Barchelder.....	Cambridge, Mass.....	Oct. 14, 1851.
Telegraph wires, insulators for.....	Zenas C. Robins.....	Washington, D. C.....	Oct. 14, 1851.
Telegraph wires, insulators for.....	John Yandell.....	St. Louis, Mo.....	Oct. 14, 1851.

Telescopes
 Telegraphs, means for obviating difficulties arising from defective insulation.
 Watches, winding.

Alvan Clark.....
 Charles S. Bulkey.....
 Theodore Noel.....

Cambridge, Middlesex, Mass.....
 Macon, Bibb county, Georgia.....
 Memphis, Tenn.....

Nov. 11, 1851.
 Aug. 26, 1851.
 Dec. 2, 1851.

CLASS IX.—*Civil engineering and architecture, comprising works, rail and common roads, bridges, canals, wharfs, docks, rivers, viers, dams, and other internal improvements, buildings, roofs, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Blasting rocks	Charles Monson	New Haven, Ct.....	April 1, 1851.
Buildings, iron connexion for the beams and columns of.....	Joseph Banks.....	New York, N. Y.....	Feb. 25, 1851.
Buildings, metallic, construction of.....	Simon Willard.....	Cincinnati, Ohio.....	Mar. 18, 1851.
Bridge, counter-braces, adjusting the effective length of.....	D. C. McCallam	Owego, N. Y.....	July 15, 1851.
Bridge trusses, arrangement of.....	Cunningham M. Pennington.....	Rome, Ga.....	Jan. 7, 1851.
Bridges, the construction of.....	Edwin Stanley.....	Bennington, Wyoming county, N. Y.....	Sept. 2, 1851.
Drilling apparatus, steam.....	Joseph W. Fowle.....	Boston, Mass.....	Mar. 11, 1851.
Excavating, machines.....	Benjamin W. Remy.....	Brookville, Brookville county, Ia.....	Oct. 21, 1851.
Fences, flexible.....	Mathias P. Coons.....	Lansingburg, Rensselaer county, N. Y.....	July 29, 1851.
Fences, hurdle.....	Cyrus C. Cole.....	Rushville, Ontario county, N. Y.....	Dec. 2, 1851.
Fence, iron.....	J. B. Wickersham.....	New York, N. Y.....	July 1, 1851.
Fence, sod, machine for making.....	H. L. F. Gavett.....	Jackson, Mich.....	Sept. 9, 1851.
Frog-guard, self-acting.....	Chas. A. Postley.....	Spring Garden, Philadelphia, Pa.....	June 24, 1851.
Gates, apparatus for opening and closing.....	Enoch Woolman.....	Damascoville, Columbiana county, Ohio.....	Dec. 2, 1851.
Pavements, method of securing ranges of short plank in.....	Joseph E. Ware.....	St. Louis, Missouri.....	Feb. 11, 1851.
Paving, &c., stone and metal, conglomerate for.....	Geo. H. Knight.....	Cincinnati, Ohio.....	April 1, 1851.
Railings.....	Sommers Crowell.....	Reading, Pa.....	June 10, 1851.
Railings, iron.....	John Krauser.....	Reading, Pa.....	April 15, 1851.
Roofs, construction of.....	Francis Wilbar.....	Roxbury, Norfolk county, Mass.....	Aug. 12, 1851.
Scraper.....	Charles Schofield and George J. John.....	Albion, Ill.....	Feb. 11, 1851.
Shutters for shop fronts.....	James Root.....	Cincinnati, Ohio.....	Aug. 5, 1851.
Vessels, method of raising sunken. (See class IX.)			
Window sashes.....	Sewall Short.....	New London, Ct.....	July 29, 1851.

V.—Classified list of patents, &c.—Continued.

CLASS X.—Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Axles, boxes for journals for railroad cars.....	Oliver N. French, assignor to O. N. French and Eb. Stevens.....	New London, Ct.....	July 15, 1851.
Axle boxes, for railroad cars.....	Robert Lexington.....	Monroe, Mich.....	Oct. 14, 1851.
Buggy tops.....	Har. Hubbard, asst. to Jar. A. Hibbard.....	Henrietta, N. Y.....	July 15, 1851.
Car couplings.....	Silas M. Cockran.....	Baltimore, Md.....	Jan. 1, 1851.
Car brakes, railroad.....	Francis A. Stevens.....	Burlington, Chittenden co., Vt.....	Nov. 25, 1851.
Cars, for transportation of coal.....	Laurence Myers.....	Philadelphia, Pa.....	June 24, 1851.
Cars, railroad, coupling.....	George Winters.....	Portsmouth, Dauphin county, Pa.....	Sept. 16, 1851.
Cars, railroad, coupling.....	Lorenzo D. Livermore.....	Hartland, Windsor county, Vt.....	Nov. 11, 1851.
Cars, railroad, excluding dust from. (See class V.)	William Nebinger.....	Sharpsburg, Washington county, Md..	Oct. 21, 1851.
Cars, railroad, running-gear of.....	Thomas A. Davies.....	New York, N. Y.....	Dec. 9, 1851.
Cars, railroad, running-gear of.....	Rickason Stillwell and E. L. Brundage.....	New York, N. Y.; Troy, N. Y.....	April 22, 1851.
Car seats.....	Ezekiel Booth and Ezra Ripley.....	Troy, N. Y.....	Nov. 11, 1851.
Car seats.....	Ezra Ripley and E. L. Brundage.....	Troy, N. Y.....	Dec. 9, 1851.
Carriages.....	John Jones.....	Clyde, N. Y.....	Jan. 14, 1851.
Carriages.....	James C. Spencer.....	Phelps, N. Y.....	May 27, 1851.
Carriages.....	George B. Durkee.....	Alden, N. Y.....	May 27, 1851.
Carriages.....	Gustavus L. Haussknecht.....	New Haven, Ct.....	Dec. 16, 1851.
Carriages.....	Lewis King.....	Madison, Madison county, N. Y.....	Dec. 23, 1851.
Carriage bodies, hanging.....	John Jones.....	Clyde, Wayne county, N. Y.....	July 22, 1851.
Carriage bodies, hanging.....	John Jones.....	Clyde, Wayne county, N. Y.....	July 22, 1851.
Carriage perches.....	Lewis E. Stillwell.....	Franklinville, Cattaraugus co., N. Y.....	Dec. 2, 1851.
Carriages, railroad, running-gear of.....	Daniel W. Eames.....	West Turin, Lewis county, N. Y.....	July 1, 1851.
Carriages, steam, for railways.....	Jos. H. Moore and Wm. P. Parrott.....	Boston, Mass.....	Dec. 2, 1851.
Carriage tops, raising.....	John L. Allen.....	New Haven, Ct.....	Jan. 14, 1851.
Felloes, bending.....	A. W. Johnston.....	St. George's, Del.....	Nov. 11, 1851.
Hubs and axles, connecting and disconnecting.....	A. M. Billings.....	Claremont, N. H.....	Jan. 14, 1851.
Hubs and axles, applying friction rollers to.....	Jos. B. & S. Wilson.....	Townsend's Inlet, N. J.....	Feb. 25, 1851.
Hubs, for boxes, machine for preparing.....	William R. Jones.....	Granville, Washington county, N. Y..	July 22, 1851.

Hubs, for reception of boxes, machine for preparing	Henry Moore	Shepardtown, Pa.	July 29, 1851.
Locomotives, moved by the power of animals	Clement Masserano, assignor to Clement Masserano, Josephine Wickliffe, administratrix of R. Wickliffe, jr., deceased, Charles Carenzi, André Cristodora, Pallegro Rocca, & Louis B. Mignonc.	Turin, kingdom of Sardinia; and Lexington, Ky.; Genoa, Sardinia	Oct. 7, 1858.
Locomotives, running-gear of	Georgé S. Griggs	Roxbury, Mass.	June 17, 1851.
Locomotives, running-gear of	James H. Murrell	Manchester, Va.	Oct. 7, 1851.
Locomotives, running-gear of	Ross Winans	Baltimore, Md.	Dec. 2, 1851.
Omnibus steps	William H. Hoyt	New York, N. Y.	May 27, 1851.
Omnibus drivers, registers for	Ira B. Person and Joel L. Brockett	Baltimore, Md.	Aug. 19, 1851.
Springs	James Webster	Leicester, England	Nov. 4, 1851; English patent, Feb. 11, 1851.
Springs, carriage	Levi Bissell	New York, N. Y.	May 20, 1851.
Springs, carriage	Chauncy H. Guard	Brownsville, N. Y.	June 10, 1851.
Springs, carriage	Gustavus L. Haussknecht	New Haven, Ct.	July 15, 1851.
Springs, carriage	M. G. Hubbard	Rochester, N. Y.	July 22, 1851.
Springs, carriage	Levi Bissell, assignor to Levi Bissell and Lyman Kinsley	New York, N. Y.	Nov. 4, 1851.
Switch, for railroads, self-adjusting and locking	John C. Past	White Haven, Pa.	June 3, 1851.
Switch, railroad	David F. Phillips	Republic, Seneca county, Ohio	Nov. 18, 1851.
Switches, railroad	William N. Raines	Thompson, Columbia county, Ga.	Dec. 2, 1851.
Tires, for railroad-car wheels	Theodore T. Abbott	Manchester, N. H.	Jan. 14, 1851.
Trucks, connecting with car bodies	Thomas P. Howe	Buffalo, N. Y.	Mar. 11, 1851.
Trucks, railroad car	Benjamin Hinkley	Troy, N. Y.	Dec. 2, 1851.
Wheels and axles, connecting and disconnecting	Simon Heywood	Clarmont, N. H.	April 1, 1851.
Wheels, car, machinery for making wrought iron	Maria Vaughn, administratrix of James C. Vaughn, deceased, assignor to James C. Bell and R. Chr. stue, jr.	Greenbush, N. Y.; New York, N. Y.	June 24, 1851.
Wheels, cast-iron car	George R. McFarlane	Holidaysburg, Pa.	Jan. 14, 1851.
Wheels, cast-iron car	P. G. Gardiner	New York, N. Y.	Mar. 11, 1851.
Wheels, cast-iron car	Thomas J. Eddy	Waterford, N. Y.	July 29, 1851.
Wheels, cast-iron car	Benjamin Severson	Schenectady, N. Y.	Oct. 21, 1851.
Wheels, cast-iron car	Isaac Vankuran	Boston, Mass.	May 20, 1851.
Wheels, cast-iron car	Albert Hebbard	Worcester, Mass.	May 20, 1851.
Wheels, railroad car	Nehemiah Hodge	Adams, Berkshire co., Mass.	Nov. 18, 1851.
Wheels, spring carriage	John Lamb and Charles H. Root	McDonough, N. Y.	Jan. 1, 1851.
Wheels to axles, method of securing	Junius Foster and David Marsh, assignors to J. Foster	Greene Point, King's co., N. Y.	Sept. 2, 1851.

V.—*Classified list of patents, &c.—Continued.*

CLASS XI.—*Hydraulics and pneumatics, including water wheels, wind mills, and other implements operated on by air or water, or employed in raising or delivering fluids.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Coupling, compound for hose or pipe.....	James W. Osgood.....	Columbus, Ohio.....	May 20, 1851.
Faucets.....	Charles W. Stearn.....	Springfield, Mass.....	July 22, 1851.
Faucets or gates, molasses.....	Erastus Stebbins.....	Chicopee, Mass.....	July 15, 1851.
Hydraulic ram.....	William Fields, Jr.....	Providence, R. I.....	Jan. 28, 1851.
Hydraulic rams, operating the waste gates in.....	John Osborn.....	Hamden, Conn.....	Feb. 11, 1851.
Liquids, apparatus for drawing and measuring.....	Richard F. Stevens.....	Syracuse, N. Y.....	Mar. 25, 1851.
Pipes, lead, machines, nozzle for.....	John B. Collian.....	Reading, Pa.....	Jan. 1, 1851.
Propellers of machinery to be used in currents.....	James Hardie.....	Victoria, Texas.....	Nov. 18, 1851.
Pumps.....	Nelson Newman.....	Cincinnati, Ohio.....	May 6, 1851.
Pumps for elevating water mixed with mineral substances.....	William Ball.....	Chicopee, Hamden co., Mass.....	Dec. 23, 1851.
Pumps for raising water, &c.....	J. F. Flanders.....	Newburyport, Mass.....	June 22, 1851.
Pumps, rotary.....	J. Stuart Gwynne.....	New York, N. Y.....	Jan. 14, 1851.
Pumps, rotary.....	Phineas Bennett.....	New York, N. Y.....	Jan. 7, 1851.
Valves, shields for.....	Alexander Jimason.....	Parkesburg, Chester co., Pa.....	Sept. 30, 1851.
Water, apparatus for raising and carrying.....	James D. Willoughby.....	Scotland, Pa.....	Feb. 18, 1851.
Watering cattle, apparatus for.....	S. W. Wood.....	Rochester, N. Y.....	Oct. 28, 1851.
Water metres.....	John Ericsson.....	New York, N. Y.....	Jan. 1, 1851.
Water metres.....	John Ericsson.....	New York, N. Y.....	Dec. 9, 1851.
Water wheels.....	James L. Parker.....	Shirley village, Middlesex co., Mass.....	Oct. 14, 1851.
Water wheels, over shot.....	Edmund Sheetz.....	Campbellstown, Lebanon co., Pa.....	Oct. 14, 1851.

CLASS XII.—*Lever, screw, and mechanical power, as applied to pressing, weighing, raising, and moving weights.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Jacks, lifting.....	Bolivar Newbury.....	Catskill, N. Y.....	May 27, 1851.
Jacks, lifting.....	James St. John.....	New York, N. Y.....	July 8, 1851.

CLASS XIII.—Grinding mills and mill gearing, including grain mills, mechanical movements, and horse-powers.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Oil presses.....	David L. Latourette.....	St. Louis, Mo.....	Oct. 28, 1851.
Presses, drop.....	Milo Peck.....	New Haven, Conn.....	Nov. 25, 1851.
Press, portable hydraulic.....	Richard Dudgeon.....	New York, N. Y.....	July 8, 1851.
Presses, self-acting.....	William Moore.....	Belleville, Richard co., Ohio.....	Sept. 30, 1851.
Presses, self-acting, cheese.....	Bethuel Gillett and Lyman Allis.....	Windsor, Hartford co., Conn.....	Aug. 26, 1851.
Weighing carts.....	A. B. Livingston.....	Portland, Fountain co., Ind.....	Sept. 30, 1851.
Weighing machine for grain, self.....	William Biddle.....	Lafayette, Ind.....	May 27, 1851.
Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bolting flour, apparatus for.....	Lewis Fagin and Henry C. Hayman.....	Cincinnati, Ohio.....	April 8, 1851.
Boxes and axles for saving oil.....	Benjamin Kraft.....	Reading, Pa.....	July 1, 1851.
Bran dusters.....	J. M. Carr and James Hughes.....	Cambridge, Ind.....	April 1, 1851.
Bran dusters.....	Wm. A. McFarland and Thos. C. Carpenter.....	Wilmington, Del.....	May 27, 1851.
Bran dusters.....	S. W. Kirk.....	Coatsville, Chester co., Pa.....	July 22, 1851.
Corn sheller.....	Joshua M. C. Armsby.....	Worcester, Mass.....	Jan. 7, 1851.
Flouring apparatus.....	James M. Clark.....	Lancaster, Pa.....	May 13, 1851.
Flour bolts.....	Samuel Cook.....	Adams Basin, N. Y.....	June 22, 1851.
Governors.....	William Gardner.....	New York, N. Y.....	June 10, 1851.
Governors.....	George H. Corliss.....	Providence, R. I.....	June 10, 1851.
Grinders, method of forming teeth upon cast iron.....	Ezra Rixley.....	Troy, N. Y.....	Aug. 12, 1851.
Horse-powers.....	Cyrus Avery.....	Tunkhannock, Pa.....	June 3, 1851.
Horse-powers.....	Aaron D. Crane.....	Newark, N. J.....	April 8, 1851.
Mills, cider.....	Nathan Chapin.....	Syracuse, N. Y.....	Sept. 2, 1851.
Mills, cider.....	David F. Phillips.....	Republic, Seneca county, Ohio.....	Nov. 25, 1851.
Mills for grinding corn and cobs.....	Sidney A. Bantz and Wm. Andrews.....	Frederick, Md.....	July 22, 1851.
Mills for grinding paints and drugs.....	Gilbert D. Jones.....	Jersey City, N. J.....	April 1, 1851.
Mills for grinding and bolting.....	Jehu Hollingsworth.....	Zanesville, Muskingum co., Ohio.....	Nov. 18, 1851.
Mills, grinding.....	William Newlove.....	Uuca, N. Y.....	Oct. 14, 1851.
Millstones.....	E. T. Hannon Valcke.....	Paris, France.....	April 15, 1851.
Millstones, dressing.....	Edmund P. Gaines.....	Milrose, Texas.....	Mar. 4, 1851.
Millstones, dressing.....	Moore Holden.....	Laurenceburg, Indiana.....	Aug. 5, 1851.
Millstones, finishing and balancing.....	George Todd.....	St. Louis, Mo.....	Nov. 18, 1851.

V.—Classified list of patents, &c.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Millstones, machines for dressing.....	E. W. Hazard and Charles H. Jenner.....	Binghamton, N. Y.; Rochester, N. Y.	Sept. 16, 1851.
Motion, changing a reciprocating into a rotary...	Joseph Harris, jr.....	Boston, Mass.....	Jan. 14, 1851.
Motion, mode of changing reciprocating into rotary	J. V. Strat.....	Litchfield, Ohio.....	July 23, 1851.
Oil cups for journal boxes.....	Aaron Richardson.....	Bellows Falls, Vt.....	July 29, 1851.
Power, governors.....	Junius Judson.....	New York, N. Y.....	Mar. 4, 1851.
Snut machines.....	Jehu Hollingsworth.....	Zanesville, Ohio.....	April 22, 1851.
Snut machines.....	Nelson Platt.....	Ottawa, Ill.....	May 20, 1851.

CLASS XIV.—Lumber, including machines and tools, for preparing and manufacturing, such as sawing, planing, mortising, shingle and staves, carpenters' and coopers' implements.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Augurs.....	Ransom Cook.....	Saratoga Springs, N. Y.....	June 17, 1851.
Augurs, &c., to their handles, means of attaching	Merritt S. Brooks.....	Chester, Middlesex county, Conn.....	Oct. 28, 1851.
Boring holes in posts, machines for.....	Thos. T. Strode.....	Coatsville, Chester county, Pa.....	Dec. 2, 1851.
Grooving lumber, machines for.....	B. Holly and Jno. W. Wheeler.....	Seneca Falls, N. Y.....	July 8, 1851.
Guages used in turning.....	C. R. Harbut.....	Rushford, N. Y.....	Sept. 9, 1851.
Irregular forms, machines for turning.....	Jonathan Russell.....	Philadelphia, Pa.....	Jan. 1, 1851.
Irregular forms, machines for turning.....	Philo S. Beers.....	Hamden, Conn.....	Feb. 18, 1851.
Irregular forms, machinery for turning.....	Aber Lane.....	Killingsworth, Conn.....	Feb. 25, 1851.
Lathes.....	T. R. Bailey.....	Leekport, N. Y.....	July 1, 1851.
Lathes, chucks for.....	Thos. J. Eddy, administrator of Jos. Hyde.....	Troy, Rensselaer county, N. Y.....	Dec. 9, 1851.
Lath machines.....	William Merrill.....	Randolph, Portage county, Ohio.....	Sept. 23, 1851.
Lath machines.....	G. W. Tolhurst.....	Cleveland, Ohio.....	Dec. 9, 1851.
Lathes, securing pinions, &c, of watches in.....	J. H. Bottom.....	New York, N. Y.....	July 15, 1851.
Mandrels, expanding.....	Walter Sherwood.....	Providence, R. I.....	Dec. 2, 1851.

Matches, machinery for making.....	Ira H. Smith, assignor to Lemuel D. Smith.....	Wolcott, Conn.; Waterbury, Conn.....	April 29, 1851.
Mitre boxes.....	Mathew Spear.....	Bowdoinham, Lincoln county, Me.....	Sept. 30, 1851.
Planes, hand.....	Benjamin F. Bee.....	Harwick, Barnstable county, Mass.....	Nov. 11, 1851.
Planing machines.....	Daniel H. Southworth.....	New York, N. Y.....	Feb. 18, 1851.
Planing machines.....	John D. Beers and Isaac Winslow.....	Philadelphia, Pa.....	Feb. 25, 1851.
Planing machines.....	Rufus Bixly, Cyrus Bixly, and John Garst.....	Dayton, Ohio.....	May 13, 1851.
Planing machines.....	Geo. W. Beardslee.....	Buffalo, N. Y.....	May 20, 1851.
Planing machines.....	Nelson Barlow.....	St. Louis, Mo.....	May 27, 1851.
Planing machines, cutters for.....	George W. Beardslee.....	Albany, N. Y.....	Nov. 4, 1851.
Planing machines for dressing the edges of boards.....	Jas. M. Patton and Wm. F. Fergus, assignors to John C. Da Costa.....	Philadelphia, Pa.....	Dec. 23, 1851.
Saw-filing machine.....	William E. Cornell.....	Boston, Mass.....	Jan. 1, 1851.
Saw-filing machinery, vice-jaw for.....	Thomas M. Chapman.....	Old Town, Penobscot county, Me.....	Sept. 2, 1851.
Saws for sawing and smoothing boards.....	George F. Putnam.....	Moran, N. Y.....	May 27, 1851.
Saw-mills.....	George F. Woolston.....	Orangeburg, dist. of Orangeburg, S. C.....	Sept. 30, 1851.
Saw-mills.....	Isaac Straub.....	Cincinnati, Ohio.....	Feb. 18, 1851.
Saw-mills.....	Lemuel Hedge, assignor to George W. Hedge.....	Brooklyn, N. Y.....	April 22, 1851.
Saw-mills, feeding logs in.....	Martin Rich.....	Fairfield, Wis.....	May 13, 1851.
Sawing machines.....	Charles Ketchum.....	Pan Yan, Yates county, N. Y.....	Dec. 9, 1851.
Saws, &c., machinery for hardening and straightening.....	Pearson Crosby.....	Fredonia, N. Y.....	April 8, 1851.
Saw-set.....	Henry Waterman.....	Williamsburg, N. Y.....	May 27, 1851.
Saw-set.....	Elijah S. Holkins.....	Painesville, Ohio.....	April 8, 1851.
Saw-set.....	Hiram Strat.....	Covington, Ky.....	April 8, 1851.
Saw-set vice.....	William Hinds.....	Cooperstown, N. Y.....	July 1, 1851.
Saws, teeth of.....	George F. Woolston.....	Orangeburg, S. C.....	Mar. 11, 1851.
Saw-mills, setting logs in.....	John W. Robbins.....	Campden, Ohio.....	April 14, 1851.
Sawing volutes, machine for.....	Elijah Whiten.....	Hingham, Plymouth county, Mass.....	Sept. 30, 1851.
Shingle machines.....	Franklin Skinner.....	Dunkirk, Chataque county, N. Y.....	Nov. 25, 1851.
Shingles, machines for dressing.....	Scymour Carver.....	Geneva, Ill.....	June 17, 1851.
Splint machines.....	Henry Melish.....	Walpole, N. H.....	April 1, 1851.
Splint machines.....	Lewis L. Gilliland.....	Dayton, Ohio.....	April 29, 1851.
Slaves dressing machine.....	William Hawkins.....	Milwaukee, Wis.....	July 22, 1851.
Slave jointing machines.....	Daniel Drawbough.....	White Hill P. O., Cumberland co., Pa.....	Nov. 11, 1851.
Slaves, machines for dressing.....	Lewis S. Chichester.....	Williamsburg, Long Island, N. Y.....	Nov. 4, 1851.
Slaves, machines for jointing.....	William McGuire.....	Cincinnati, Ohio.....	Jan. 7, 1851.
Slaves, machines for sawing and dressing.....	Dennison Woodcock.....	Independence Centre, N. Y.....	July 15, 1851.
Slaves, machines for jointing.....	Lewis S. Chichester.....	Williamsburg, King's county, N. Y.....	Aug. 12, 1851.

V.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Tenoning, boring, &c., machines for.....	Martin and Thomas R. Way.....	Paintersville, Ohio.....	Mar. 11, 1851.
Tonguing, jointing and rebauing tool for.....	John A. Fry.....	Edinburg, Va.....	Feb. 18, 1851.
Tool, half adjustable.....	Peter H. Niles.....	Boston, Mass.....	Aug. 26, 1851.

CLASS XV.—*Stone and clay manufactures, including machines for pottery, glass-making, brick-making, dressing and preparing stone, cements, and other building materials.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Brick machines.....	Mahlon Gregg.....	Philadelphia, Pa.....	June 17, 1851.
Brick machines.....	John J. Riddle.....	Covington, Ky.....	July 22, 1851.
Brick machines.....	James Dane, Darius Healey, and Gary Cummings, assignors to Isaac and Francis Dane.....	Derby, Vt.....	Aug. 5, 1851; antedated June 17, 1851.
Brick machines.....	Luther Brown.....	Canandaigua, N. Y.....	Aug. 5, 1851.
Brick machines.....	Isaac Gregg.....	Pittsburg, Pa.....	Aug. 5, 1851.
Brick machines.....	Richard Long.....	Columbus, Ohio.....	Aug. 19, 1851.
Brick, machines for preparing clay for making.....	Heman Whipple.....	Port Richmond, N. Y.....	Mar. 25, 1851.
Brick presses.....	Jacob Scheitlin.....	Louisville, Ky.....	Jan. 21, 1851.
Brick presses.....	John J. Riddle.....	Covington, Ky.....	April 1, 1851.
Brick presses.....	J. Z. A. Wagner.....	Philadelphia, Pa.....	April 8, 1851.
Brick presses.....	Joseph Grant.....	Providence, R. I.....	May 13, 1851.
Clay pipes, manufacture of.....	Daniel and George Duchemin.....	Cincinnati, Ohio.....	Dec. 2, 1851.
Earthenware, baked, ornamenting.....	Joseph Putnam.....	Salem, Mass.....	Sept. 30, 1851.
Glass, frosting plates of.....	Ralph B. Beech.....	Kensington, Ky.....	June 3, 1851.
Glass, machinery for cutting.....	Isaac Taylor.....	New York, N. Y.....	Nov. 11, 1851.
Glass, machinery for cutting.....	John P. Colne.....	New York, N. Y.....	Aug. 26, 1851.

CLASS XVI.—*Leather, including tanning and dressing, manufactures of boots, shoes, saddlery, harness, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Kilns, lime.....	Samuel Brown.....	Berwick, Pa.....	Aug. 26, 1851.
Kilns, lime.....	Richard E. Schroeder.....	Rochester, N. Y.....	May 6, 1851.
Marble, ornamenting.....	C. F. Hill and H. Hoffman.....	New York, N. Y.....	April 15, 1851.
Pottery and other ware, working clay for.....	John Akrell.....	Williamsburg, N. Y.....	Aug. 5, 1851.
Stone and other substances, machine for facing and polishing.....	Albert Eames.....	Springfield, Mass.....	June 10, 1851.
Stone drilling machine.....	Henry Goulding.....	Boston, Mass.....	Sept. 16, 1851.
Stone, machines for dressing.....	Joseph V. Tilton.....	Marcellus, Onondaga county, N. Y.....	Oct. 21, 1851.
Stone, machines for dressing.....	William Wheeler.....	West Poutnef, Vt.....	Dec. 23, 1851.
Boot crimps.....	Nathan Dawes and Higgins Harrison..	Little York, N. J.....	May 27, 1851; antedated Jan. 31, 1851.
Boot crimps.....	Hartwell Stanley.....	Wilmington, Vt.....	Aug. 19, 1851.
Boot forms, machine for dressing.....	Joseph Burgess.....	Leicester, Mass.....	July 22, 1851.
Boots and shoes, machines for cutting the soles of.....	Jos. Steger, assignor to Wm. Mitchell..	Roxbury, Norfolk co., Mass; Boston, Mass.....	Nov. 11, 1851.
Boots and shoes, machines for pegging.....	Alpheus C. Gallahue.....	Matamoras, Washington co., Ohio.....	Oct. 28, 1851.
Boot-trees.....	Davis R. Hendrix.....	Pottstown, Montgomery co., Penn.....	Oct. 28, 1851.
Collars, for harness.....	Joseph W. Briggs.....	Cleveland, Ohio.....	June 3, 1851.
Collars, horse.....	Richard Rickey.....	Rutland, Ohio.....	Nov. 11, 1851.
Collars, or patterns.....	Isaac Davis.....	Mechanicsburg, Champaigne co., Ohio.....	Nov. 4, 1851.
Gauges, feather-edging for shoemakers.....	Charles W. Stearns.....	Springfield, Mass.....	April 22, 1851.
Harness-saddles.....	J. Jenkins.....	Andover, Essex co., Mass.....	July 22, 1851.
Harness, saddle-trees for.....	John McLain.....	Circleville, Pickaway co., Ohio.....	Dec. 23, 1851.
Hides, bating and tanning.....	Jas. A. Lawrence, assignor to Roberts & Lamsen.....	New Haven, Conn.....	July 22, 1851.
Hides, machines for cutting.....	William B. Milligan.....	Edinburg, Shenandoah co., Va.....	Nov. 4, 1851.
Hides, machines for preparing.....	Jacob C. Flint.....	Boston, Mass.....	Nov. 11, 1851.
Lap awls for shoemakers.....	Thomas W. Jones.....	Philamath, Ga.....	Feb. 4, 1851.
Lasts, blocks, fastenings for.....	Henry Brunk.....	Albany, N. Y.....	May 27, 1851.
Leather, machines for splitting.....	Levi R. Rockwood, assignor to Joseph L. Woodward.....	Upton, Worcester co., Mass.....	Sept. 16, 1851.
	William Panton.....	Milton, Mass.....	July 15, 1851.

V.—Classified list of patents, &c.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Leather, machines for stretching.....	Wm. Strevell and Danl. Brown.....	Albany, N. Y.....	April 22, 1851.
Leather, machines for stretching.....	Bradford Rowe.....	Albany, N. Y.....	April 22, 1851.
Leather splitting machines.....	A. Richardson.....	North Enfield, Grafton co., N. H.,	Sept. 16, 1851.
Leather tubes, machines for making.....	Newell Wyllys, assignor to Chas. Collins and Newell Wyllys.....	Glastenbury, Hartford co., Conn.....	Dec. 23, 1851.
Saddles.....	John C. fr. Salomon.....	Cincinnati, Ohio.....	Oct. 21, 1851.
Saddles, spring.....	Joseph C. Smith.....	Stoughtown, Penn.....	April 29, 1851.
Shoes, India rubber.....	Horace H. Day.....	Jersey City, N. J.....	May 20, 1851.
Shoe latches.....	Isaac Bannister.....	Newark, N. J.....	Sept. 23, 1851.
Spring saddles.....	John C. fr. Salomon.....	Cincinnati, Ohio.....	Nov. 18, 1851.
Tanning.....	Nathan C. Towle.....	Washington, D. C.....	Oct. 7, 1851.
Trunk handles.....	Elijah A. Andrews.....	New Britain, Conn.....	Mar. 18, 1851.

CLASS XVII.—Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing, &c.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bedsteads.....	Harvey W. Sabin.....	Canandaigua, Ontario co., N. Y.....	July 1, 1851.
Bedsteads.....	Ira Russell.....	Dedham, Mass.....	Sept. 16, 1851.
Bedsteads.....	Levi Newcomb, jr.....	New Bedford, Mass.....	Nov. 11, 1851.
Bedsteads, attaching cutters for cutting screws on rails of.....	Jacob Zimmer.....	Tiffin, Seneca co., Ohio.....	Dec. 23, 1851.
Bedstead fastenings.....	James R. Kai and Spencer Lewis.....	Tiffin, Ohio.....	May 6, 1851.
Bedsteads, machine for cutting screws on rails of.....	Spencer Lewis.....	Rochester, N. Y.....	Oct. 7, 1851.
Bedsteads, machines for cutting screws on posts and rails of.....	O. Thornly.....	Lebanon, Ind.....	Oct. 7, 1851.
Bedstead rails, machines for cutting screws on.....	H. Gross and Wm. Campbell.....	Tiffin, Ohio.....	April 1, 1851.
Bread cutters.....	A. E. Lazell and D. Lazell.....	Chicopee Falls, Mass.....	July 1, 1851.

Brushes and brooms, handles of.....	L. F. Cavanaugh.....	Newfield, Tompkins co., N. Y.....	July 1, 1851.
Brushes, manufacture of.....	A. R. Davis.....	East Cambridge, Mass.....	Aug. 19, 1851.
Cabbage cutters.....	Hiram Carver.....	Edinborough, Va.....	Aug. 26, 1851.
Chair seats.....	John W. Drummond, assignor to Smith Ely.....	Skeneateles, Onondaga co., N. Y.; New Brighton, N. Y.....	Dec. 16, 1851.
Coffee roasters.....	Edward Whitely.....	Boston, Mass.....	April 22, 1851.
Cradles, swinging.....	Lucius F. Whiaker.....	Raleigh, Wake co., N. C.....	Oct. 21, 1851.
Cradles, swinging.....	S. W. Knowles.....	Middletown, Conn.....	Oct. 28, 1851.
Cutters, cheese, butter and bread.....	Benjamin F. Adams.....	Bangor, Me.....	Nov. 11, 1851.
Desks.....	John T. Hammitt.....	Philadelphia, Penn.....	Nov. 4, 1851.
Drying fruits, and other articles, revolving frames for.....	J. H. Morris and D. Flanders.....	Parishville, St. Lawrence co., N. Y.....	Nov. 18, 1851.
Easy chairs, for invalids, &c.....	J. C. Dickey.....	Washington, D. C.....	June 3, 1851.
Fastening pedestals to columns.....	Patrick O'Neill.....	Brooklyn, N. Y.....	Sept. 23, 1851.
Gongs.....	Wm. and Wm. H. Lewis.....	New York, N. Y.....	June 24, 1851.
Mattresses, spring, for invalids.....	Vine B. Starr.....	East Hampton, Middlesex co., Conn.....	Nov. 18, 1851.
Mattresses, stuffing, &c., machines for cutting wood into shreds, and crimping them for.....	David Baird.....	New York, N. Y.....	Jan. 7, 1851; antedated Oct. 1, 1850.
Meat-cutting machines.....	Edwin K. Browning.....	Utica, N. Y.....	July 15, 1851.
Peeling and cutting peaches.....	Thomas Vanderslice.....	Valley Forge, Penn.....	May 6, 1851.
Quilting frames and apparatus.....	Joshua O. Ward.....	Pleasant Valley, Dutchess co., N. Y.....	Oct. 21, 1851.
Sad-irons.....	Abraham Kaufman.....	Orrstown, Penn.....	Jan. 1, 1851.
Sad-irons, removable handles to.....	Edward Clapp, assignor to Ed. Clapp & George Alden.....	Dedham, Mass.....	Feb. 25, 1851.
Tables, ladies' work.....	Theodore R. Timby.....	Meridian, N. Y.....	Mar. 18, 1851.
Tables, leaves, fastening down of.....	Celia R. P. Foster, late Celia R. P. Wood	Canandaigua, N. Y.....	April 8, 1851.
Tables, extension.....	Lewis J. Mason.....	Franklinville, N. Y.....	April 8, 1851.
Tables, extension.....	Francis Hoguet.....	Philadelphia, Pa.....	Feb. 25, 1851.
Wash-boards.....	Lewis Thorn.....	Philadelphia, Pa.....	Mar. 25, 1851.
Washing apparatus.....	William T. Barnes.....	Buffalo, N. Y.....	June 17, 1851.
Washing machines.....	James T. King.....	Baltimore, Md.....	Oct. 21, 1851.
Washing machines.....	John O'Neil.....	Xenia, O.....	June 10, 1851.
Washing machines.....	John Boardman.....	Little Valley, N. Y.....	June 15, 1851.
Washing machines.....	David Allen.....	St. Louis, Mo.....	Aug. 26, 1851.
Window-curtain fastening.....	Erastus Lawrence.....	Dublin, Ind.....	Sept. 9, 1851.
Window-curtain fixtures.....	Hugh Guyer.....	Albany, N. Y.....	Mar. 11, 1851.
	S. S. Putnam.....	Boston, Mass.....	April 15, 1851.

V.—Classified list of patents, &c.—Continued.

CLASS XVIII.—*Arts, polite, fine, and ornamental, including music, painting, sculpture, engraving, books, paper, printing, binding, jewelry, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Account-books, machines for numbering the pages of.....	John McAdams.....	Boston, Mass.....	Aug. 12, 1851.
Æolian attachments.....	Gustavus W. Ingalls.....	Concord, N. H.....	Dec. 23, 1851.
Books, machine for finishing the backs of.....	Charles Starr.....	New York, N. Y.....	June 24, 1851.
Carving machines.....	Lewis S. Chichester.....	Williamsburg, N. Y.....	June 3, 1851.
Copying presses.....	A. A. Wilder.....	Detroit, Mich.....	Mar. 11, 1851.
Daguerreotype apparatus.....	William, Wm. H. & H. J. Lewis.....	New York, N. Y.....	Nov. 11, 1851.
Daguerreotype pictures.....	Charles J. Anthony.....	Pluttsburg, Pa.....	Jan. 1, 1851.
Daguerreotype plates, buffing apparatus for.....	William & Wm. H. Lewis.....	New York, N. Y.....	July 22, 1851.
Daguerreotype, securing in monumental stones.....	Solon Jenkins, jr.....	West Cambridge, Mass.....	Mar. 11, 1851.
Embossing backs of books, tool for.....	Charles Starr.....	New York, N. Y.....	Jan. 21, 1851.
Enamelling mouldings, &c, machinery for.....	Robert Marcher.....	Cornwall, Orange county, N. Y.....	Oct. 21, 1851.
Ink-stands.....	Henry Whitney, jr.....	Cambridge, Mass.....	July 1, 1851.
Ink-stands, fountain.....	Francis Draper.....	East Cambridge, Mass.....	Jan. 7, 1851.
Jasper mineral, composition resembling.....	John Paige Pepper.....	New Britain, Hartford county, Conn.....	Dec. 16, 1851.
Lenses, adjusting.....	William & William H. Lewis.....	New York, N. Y.....	Dec. 16, 1851.
Marble, imitating.....	Hiram Tucker.....	Cambridge, Mass.....	Oct. 14, 1851.
Musical instruments, bellows for.....	Marvin Smith.....	New Haven, Conn.....	Feb. 25, 1851.
Organs and piano fortes, combining.....	R. M. Ferris.....	New York, N. Y.....	Dec. 16, 1851.
Pens, fountain.....	N. A. Prince.....	New Gloucester, Cumberland co., Me.....	Sept. 30, 1851.
Pens for ruling paper.....	Alfred Hathaway.....	Boston, Mass.....	Jan. 28, 1851.
Photographic purposes, mercury baths for.....	John Moulson.....	Philadelphia, Pa.....	Sept. 2, 1851.
Piano fortes.....	Michael Miller.....	Rochester, Monroe county, N. Y.....	July 1, 1851.
Piano fortes.....	L. H. Browne.....	Boston, Mass.....	Sept. 23, 1851.
Piano fortes.....	T. Gilbert.....	Boston, Mass.....	Sept. 30, 1851.
Piano fortes.....	Frederick Mathushek.....	Boston, Mass.....	Oct. 28, 1851.
Piano forte action.....	John Ruck.....	New York, N. Y.....	Mar. 11, 1851.
Piano forte action.....	Randolph Kretor.....	New York, N. Y.....	Sept. 9, 1851.
Piano forte action.....	R. M. Kerrison.....	Philadelphia, Pa.....	Sept. 9, 1851.

Piano forte action.....	James A. Gray.....	Albany, N. Y.....	Sept. 9, 1851.
Piano forte horizontal, square.....	George Bacon & Richard Raven.....	New York, N. Y.....	Aug. 26, 1851.
Piano forte strings.....	Henry J. Newton.....	New York, N. Y.....	Oct. 21, 1851.
Piano fortes, upright.....	Henry Klepfer.....	Cincinnati, Ohio.....	Mar. 25, 1851.
Printing house paper, machines for.....	Milton D. Whipple, assignor to Essex Company.....	Lowell, Mass.....	Sept. 16, 1851.
Printing in colors, machines for.....	Richard S. Weaver.....	Maysville, Ky.....	Oct. 28, 1851.
Printing names of subscribers on newspapers, &c.....	Henry Moeser.....	Pittsburg, Pa.....	June 24, 1851.
Printing presses.....	Stephen P. Ruggles.....	Boston, Mass.....	Jan. 1, 1851.
Printing presses.....	George P. Gordon.....	New York, N. Y.....	Aug. 5, 1851.
Printing presses.....	Jacob Worms, assignor to J. Phalem.....	Paris, France; New York, N. Y.....	Sept. 23, 1851; French patent dated May 19, 1849.
Printing presses.....	John R. Hathaway & John P. Strippel.....	Norfolk, Va.....	Oct. 21, 1851.
Printing presses.....	T. H. Dodge.....	Nashua, Hillsborough county, N. H.....	Nov. 18, 1851.
Ruling machines, regulators for the penbeam in.....	W. O. Hickok.....	Harrisburg, Pa.....	June 17, 1851.
Ruling paper, machines for.....	G. L. Wright and J. Ames.....	Springfield, Mass.....	Dec. 23, 1851.
Sounding boards, for musical instruments, construction of.....	C. Bogart.....	Charlestown, Mass.....	Dec. 9, 1851.
Stamps, hand.....	Stephen P. Ruggles.....	Boston, Mass.....	Sept. 23, 1851.
Stamps, letter.....	Benjamin Chambers.....	Washington, D. C.....	Sept. 23, 1851.
Stereotype plates, moulding and casting.....	Charles Hobbs.....	New York, N. Y.....	Sept. 2, 1851.
Type-casting machines.....	John J. Sturgess, assr to H. H. Green.....	New York, N. Y.....	Sept. 9, 1851.
Violins, &c., construction of.....	William B. Tilton.....	Carrollton, Ala.....	Sept. 2, 1851.
Wind instruments, the mouth-piece for.....	Charles L. Meech.....	Preston, New London county, Ct.....	Oct. 21, 1851.
Writing, apparatus for giving ease to the arm in.....	Jos. G. Goshen and Wm. H. Towers.....	Sherleysburg, Pa., Bucyrus, Ohio.....	April 29, 1851.

CLASS XIX.—Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Cannon, for throwing chain-shot.....	Adam Lemmer.....	Newark, N. J.....	Nov. 18, 1851.
Fire-arms, breech-loading.....	Edward Maynard.....	Washington, D. C.....	May 27, 1851.
Fire-arms, breech-loading.....	Horace Smith, assignor to Courtland Palmer.....	New York, N. Y.....	Aug. 26, 1851.
Fire-arms, revolving breech.....	P. W. Porter.....	Memphis, Tenn.....	July 8, 1851.

V.—Classified list of patents, &c.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Fire-arms, revolving breech.....	James Warnen.....	Springfield, Mass.....	July 15, 1851.
Lock, fly-tumbler, for fire-arms.....	Stanhope W. Marston.....	New York, N. Y.....	Jan. 7, 1851.
Pistols, revolving breech.....	Joshua Stevens, assignor to Massachusetts Arms Company.....	Chicopee, Hampden county, Mass.....	Oct. 7, 1851.
Repeating fire-arms, means for revolving the breeches of.....	James Warnen.....	Springfield, Mass.....	Jan. 7, 1851.

CLASS XX.—Surgical and medical instruments, including trusses, dental instruments, bathing apparatus, &c.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Baths, shower.....	William H. Brown.....	Worcester, Worcester county, Mass.....	Oct. 14, 1851.
Dental hydraulic cups.....	James Harrison.....	Jamesstown, Chataque county, N. Y.....	Aug. 26, 1851.
Forceps, dental.....	J. C. Burch.....	Evansville, Ia.....	Sept. 9, 1851.
Scarificators.....	Frederick Leyboldt.....	Philadelphia, Pa.....	May 20, 1851.
Shoulder-braces, combined with abdominal supporters.....	John S. Dare.....	Knightstown, Ia.....	Aug. 12, 1851.
Sight, means of renovating and correcting.....	Jonathan Ball.....	New York, N. Y.....	April 22, 1851.
Soda powders, &c., machines for crimping package papers for.....	Carlos A. Cook.....	Lowell, Mass.....	Dec. 2, 1851.
Stamming, instruments for the cure of.....	Robert Bates.....	Philadelphia, Pa.....	Sept. 30, 1851.
Stethoscopes.....	Nathan B. Marsh.....	Cincinnati, Ohio.....	Dec. 16, 1851.
Supporters, abdominal.....	Moses L. Knapp.....	Painesville, Ohio.....	Jan. 28, 1851.
Supporters, abdominal.....	Allen J. Lonsbury.....	Somerville, Fayette county, Tenn.....	Nov. 11, 1851.
Teeth, mineral setting.....	John Allen.....	Cincinnati, Ohio.....	Dec. 23, 1851.
Teeth, porcelain inserting.....	William Willshire Riley.....	Columbus, Ohio.....	Nov. 18, 1851.
Teeth, setting.....	Adolph F. Ahrens.....	Philadelphia, Pa.....	May 13, 1851.
Teeth, setting.....	Adolph F. Ahrens.....	Philadelphia, Pa.....	May 13, 1851.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Buttons, silk, covered.....	H. Heinemann	New York, N. Y.....	July 8, 1851.
Combs, cutting machines.....	Horace S. Cook, assignor to H. S. Cook and S. Colbron.....	Leoninster, Mass.....	June 3, 1851.
Combs, cutting machines.....	Thomas W. Hill.....	Leoninster, Mass.....	June 10, 1851.
Combs, machines for cutting.....	S. Curtis.....	Newtown, Fairfield county, Ct.....	Nov. 18, 1851.
Fastenings, for garments.....	Elias Howe, jr.....	Cambridge, Middlesex, Mass.....	Nov. 25, 1851.
Garments, apparatus for pressing.....	Joseph W. Thorpe.....	South Weare, Hillsborough co., N. H.....	Dec. 16, 1851.
Hat bodies, machines for making.....	Daniel Barnam	Philadelphia, Pa.....	July 1, 1851.
Hats, machines for pressing.....	John Stearns	Templeton, Worcester county, Mass.....	July 8, 1851.
Hooks and eyes, fastening to paper cards.....	Chester J. Carrington.....	Waterbury, Ct.....	Sept. 9, 1851.
Hooks and eyes, wire	Charles Atwood	Derby, New Haven county, Ct.....	July 1, 1851.
Suspenders.....	Julius Hotchkiss, ass'r to the Hotchkiss and Meriman Manufacturing Co.....	Waterbury, New Haven county, Ct.....	Dec. 23, 1851.
Sword canes.....	S. A. Hudson	Worcester, Mass.....	Sept. 9, 1851.
Tailors' measures	James McGinnis.....	Lockport, N. Y.....	Dec. 2, 1851.
Tailors' measures	Edward Virtue	Philadelphia, Pa.....	Dec. 16, 1851.

CLASS XXII.—*Miscellaneous.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Ayes and noes, machine for taking.....	G. William Yerby	Washington, D. C.....	Aug. 5, 1851.
Boxes, machine for cutting out the corners and scoring the edges of paper for.....	Andrew Dennison.....	Brunswick, Me.....	Dec. 4, 1851, antedated April 15, 1851.
Box opener	Geo. C. Taft.....	Worcester, Worcester county, Mass.....	Oct. 21, 1851.
Baby jumper	C. Rice.....	Elizabethtown, N. J.....	Oct. 28, 1851.
Burglar alarms	John G. Bolen.....	New York, N. Y.....	Oct. 21, 1851.
Cork cutting machine.....	William King.....	New York, N. Y.....	July 8, 1851.

V.—*Classified list of patents, &c.*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Corks, machines for cutting.....	George Hammer.....	Philadelphia, Pa.....	Oct. 14, 1851.
Fly trap.....	Harvey Snow and Luther P. Smart...	Lowell, Mass.....	July 29, 1851.
Harpoon, exploding.....	Charles Burt.....	Belfast, Me.....	May 6, 1851.
Horn and shells, machines for splitting.....	Jabez Robins, assignor to Joel R. Morse	Leominster, Mass.....	June 24, 1851.
Ice, process for the artificial production of.....	John Gornie.....	New Orleans, La.....	In England, Aug. 22, 1850; in U. S., May 6, 1851.
Retans, machinery for cutting, &c.	Sylvanus Sawyer.....	Templeton, Mass.....	June 24, 1851.
Swings, portable.....	Enoch S. Farnon.....	Philadelphia, Pa.....	May 27, 1851.
Teapins, apparatus for setting up.....	Thomas J. Sloan.....	New York, N. Y.....	April 8, 1851.
Teapins, method of setting up.....	Thomas E. Shull.....	Lewistown, Mifflin county, Pa.....	Dec. 23, 1851.
Water closets, portable.....	George R. Wilnot.....	Meriden, New Haven county, Conn....	Oct. 21, 1851.
Yeas and nays, machines for taking.....	Thos. B. Stout and Jas. F. Morrell....	Keyport, N. J.....	Oct. 28, 1851.

PATENTS REISSUED DURING THE YEAR 1851.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.	Reiss'd.
Augers, method of attaching to their handles.....	Esther L. Larkin, administratrix of Jno. E. Larkin, deceased.	Milton, N. Y.....	Nov. 19, 1850.....	1851. June 17
Bats for felting, &c., machinery for forming.....	Thos. R. Williams, assign'r to J. B. Hyde	New York, N. Y.....	Dec. 14, 1840.....	May 6
Bats in felting, &c., machinery for hardening.....	Thos. R. Williams, assign'r to J. B. Hyde	New York, N. Y.....	Dec. 14, 1840.....	May 6
Boiler, steam, and furnace thereof.....	Horace Boardman.....	Plattsburg, N. Y.....	Aug. 14, 1849.....	Feb. 25
Carriages.....	John Jones.....	Clyde, N. Y.....	Jan. 14, 1851.....	Mar. 4
Composition for covering hams, &c.....	Horace Billings.....	Beardstown, Ill.....	April 9, 1850.....	Mar. 25
Cut-off and working the valves of steam-engines..	George H. Corliss.....	Providence, R. I.....	Mar. 10, 1849.....	May 13
Door locks.....	John P. Sherwood, assignor to Calvin Adams.	Pittsburg, Pa.....	Dec. 17, 1842.....	May 13

Evaporators and condensers.....	Edward Lynch.....	Brooklyn, N. Y.....	July 18, 1848.....	Mar. 11
Felloes for the wheels of carriages and wagons, machine for setting or bending.	Edward Reynolds.....	Haddonfield, N. J.....	July 17, 1835, extended.	Jan. 1
Fire-arms	William W. Hubbell.....	Philadelphia, Pa.....	July 1, 1844.....	Mar. 11
Guages, steam and vacuum.....	Paul Stillman.....	New York, N. Y.....	May 9, 1848.....	July 29
Jacquard, machinery for weaving all kinds of figured cloth.	Alexander Calderhead.....	Philadelphia, Pa.....	Feb. 3, 1841.....	May 13
Manifold permutation locks	Robert Newell.....	New York, N. Y.....	Sept. 25, 1838.....	Dec. 2
Mouldings, machinery for making.....	Alfred T. Serrell.....	New York, N. Y.....	May 16, 1848.....	Jan. 7
Mowing machine.....	Wm. F. Ketchum.....	Buffalo, N. Y.....	July 10, 1847.....	Oct. 21
Paper-folding machines.....	Edward N. Smith, assignor through others to American Paper-folding Co.	West Brookfield, Mass.....	Nov. 27, 1849.....	Jan. 7
Paper, rag, machines for cleaning.....	James Phelps.....	Springfield, Mass.....	.....	.....
Sewing machines	Sherburn C. Blodget and John A. Lerow.	West Sutton, Mass.....	Nov. 24, 1843.....	Mar. 25
Sofa bedsteads.....	Russell Scarritt.....	Georgetown, Mass., and Boston, Mass.	Oct. 2, 1849.....	Jan. 4
Stone dressing.....	Charles Wilson.....	St. Louis, Mo.....	Oct. 8, 1850.....	Jan. 7
Scythes to the snath, fastenings of.....	E. S. Clapp	Springfield, Mass.....	Mar. 13, 1847.....	Mar. 4
Screw wrench.....	Solyman Merrick	Montague, Franklin co., Mass.	Mar. 18, 1851.....	July 8
Tanning processes	Harmon Hibbard, assignor to W. W. Reid.	Springfield, Mass.....	Original patent, Aug. 17, 1835; reissued May 17, 1842; extended 7 years from August 17, 1849.	Nov. 25
Thread, machinery for doubling, twisting, and reeling.	Frank Cheney.....	Rochester, N. Y.....	Oct. 16, 1849.....	Feb. 11
		Manchester, Conn.....	Oct. 9, 1847.....	Apr. 29

CLASSIFIED LIST OF PATENTS.—DESIGNS.

Designs.	Patentees.	Residence.	Date of patent.
Bedsteads.....	P. M. Hutton.....	Troy, N. Y.....	May 20, 1851.
Bedsteads, cast iron.....	Pelataih M. Hutton.....	Troy, N. Y.....	Sep. 2, 1851.
Bust of Jenny Lind.....	Thomas Ball	Boston, Mass.....	April 29, 1851.
Clock frame.....	Nathaniel A. Batchelor.....	New York, N. Y.....	May 13, 1851.
Comb for ladies.....	Aaron Cook.....	Newtown, Fairfield co., Conn.....	Aug. 19, 1851.

V.—*Classified list of patents, &c* —Continued.

Designs.	Patentees.	Residence.	Date of patent.
Floor oil-cloth	James Hutchinson, assignor to D. A. E. and N. Powers.....	Troy, N. Y.; Lansingburg, N. Y.....	May 13, 1851.
Fences, cast iron.....	John T. Davy.....	Troy, N. Y.....	Oct. 21, 1851.
Floor oil-cloth.....	James Hutchinson, assignor to Deborah, Albert E., and N. B. Powers.....	Troy, N. Y.; Lansingburg, N. Y.....	Sep. 2, 1851.
Furnace registers.....	Gardner Chilson.....	Boston, Mass.....	Mar. 4, 1851.
Furnace registers.....	Gardner Chilson.....	Boston, Mass.....	Mar. 4, 1851.
Furnace registers.....	Gardner Chilson.....	Boston, Mass.....	Mar. 4, 1851.
Gates, metallic.....	Gardner Chilson.....	Boston, Mass.....	Mar. 4, 1851.
Grates, parlor.....	Ebenezer Weeman.....	Charlestown, Mass.....	Sep. 16, 1851.
Grates, parlor.....	Joseph Pratt.....	Boston, Mass.....	Mar. 25, 1851.
Grates, parlor.....	Winslow Ames, assignor to Hartshorn and Ames.....	Nashua, N. H.; Boston, Mass.....	April 1, 1851.
Hat stand.....	Charles Muller.....	Tompkinsville, Richmond co., N. Y. . .	Nov. 18, 1851.
Iron railing.....	Frederick Fitzgerald, assignor to Silas C. Herring and John Ryer.....	New York, N. Y.....	Nov. 18, 1851.
Pedestals and columns.....	W. and W. H. Lewis.....	New York, N. Y.....	Mar. 25, 1851.
Presses, mantel-pieces, &c., for frames for.....	Edmund L. Freeman.....	Belville, Jefferson co., N. Y.....	Dec. 23, 1851.
Shovel, stands for.....	Charles Zeuner, assignor to M. Greenwood & Co.....	Cincinnati, Ohio.....	Sep. 9, 1851.
Stoves.....	R. J. Blanchard, assignor to Learned and Thatcher.....	Albany, N. Y.....	July 29, 1851.
Stoves.....	R. J. Blanchard, assignor to Learned and Thatcher.....	Albany, N. Y.....	July 29, 1851.
Stoves.....	R. J. Blanchard, assignor to Learned and Thatcher.....	Albany, N. Y.....	July 29, 1851.
Stoves.....	Silas Merchant.....	Cleveland, Ohio.....	Sep. 2, 1851.
Stoves.....	Sam. H. Sailor, assignor to North, Harrison, and Chase.....	Kensington, Philadelphia co., Pa.; Philadelphia, Pa.....	Sep. 2, 1851.
Stoves.....	Anthony W. Jones, assignor to James McGregor, jr.....	New York, N. Y.; Troy, N. Y.....	Sep. 2, 1851.
Stoves.....	Lyman Cobb.....	Akron, Summit co., Ohio.....	Oct. 14, 1851.
Stoves.....	Charles J. Woolson.....	Cleveland, Ohio.....	Oct. 14, 1851.

Stoves.....	William Savery.....	New York, N. Y.....	Oct. 21, 1851.
Stoves.....	Ezra Ripley, assignor to Chollar, Sage, and Dunham.....	Troy, N. Y.....	Oct. 28, 1851.
Stoves.....	S. W. Gibbs, assignor to North, Harrison, and Chase.....	Albany, N. Y.; Philadelphia, Pa.....	Nov. 11, 1851.
Stoves.....	W. Ames, assignor to J. Hartshorn and W. Ames.....	Nashua, Hillsborough co., N. H.....	Dec. 9, 1851.
Stoves.....	Jeremiah D. Green, assignor to Bachus, Bacon & Co.....	Troy, N. Y.; Le Roy, N. Y.....	Dec. 9, 1851.
Stoves.....	Samuel W. Gibbs, assignor to Jagger, Tredwell, and Perry.....	Albany, N. Y.....	Mar. 4, 1851.
Stoves.....	Samuel W. Gibbs, assignor to Jagger, Tredwell, and Perry.....	Albany, N. Y.....	Mar. 4, 1851.
Stoves.....	Samuel W. Gibbs, assignor to Jagger, Tredwell, and Perry.....	Albany, N. Y.....	Mar. 4, 1851.
Stoves.....	John S. Perry.....	Albany, N. Y.....	June 10, 1851.
Stoves.....	J. Wager, D. Pratt, and V. Richmond.....	Albany, N. Y.....	Mar. 4, 1851.
Stoves.....	Ezra Ripley, assignor to D. Stafford & Co.....	Troy, N. Y.....	May 20, 1851.
Stoves.....	N. P. Richardson.....	Troy, N. Y.....	May 27, 1851.
Stoves.....	William L. Hathaway.....	Portland, Maine.....	May 27, 1851.
Stoves.....	W. L. Sanderson, assignor to R. R. Finch.....	Deighton, Mass.....	May 27, 1851.
Stoves.....	A. Cox, E. Johnson, and D. B. Cox.....	Troy, N. Y.; Peekskill, N. Y.....	June 3, 1851.
Stoves.....	A. Cox, E. Johnson, and D. B. Cox.....	Troy, N. Y.....	June 10, 1851.
Stoves.....	W. G. Hallman.....	Troy, N. Y.....	June 10, 1851.
Stoves.....	Jno. F. Rathbone.....	Philadelphia, Pa.....	June 10, 1851.
Stoves.....	D. Stuart and J. Beesley, assignors to W. P. Cresson.....	Albany, N. Y.....	June 10, 1851.
Stoves.....	Joseph G. Lamb.....	Philadelphia, Pa.....	June 10, 1851.
Stoves.....	Joseph G. Lamb.....	Cincinnati, Ohio.....	June 17, 1851.
Stoves.....	Samuel A. House.....	Cincinnati, Ohio.....	June 17, 1851.
Stoves.....	W. C. Davis.....	Mechanicsville, N. Y.....	June 24, 1851.
Stoves.....	N. S. Vedder, assignor to A. T. Dunham & Co.....	Cincinnati, Ohio.....	July 8, 1851.
Stoves.....	Charles Gilbert and Mirehel G. Hallman, assignors to Charles Gilbert.....	Troy, N. Y.....	July 29, 1851.
Stoves.....	Elihu Smith.....	Philadelphia, Pa.....	Jan. 1, 1851.
Stoves.....	Joseph G. Lamb.....	Albany, N. Y.....	Jan. 7, 1851.
Stoves.....		Cincinnati, Ohio.....	Jan. 21, 1851.

V.—Classified list of patents, &c.—Continued.

Designs.	Patentees.	Residence.	Date of patent.
Stoves.....	Sam. W. Gibbs, assignor to North, Harrison & Co.....	Albany, N. Y.; Philadelphia, Pa.....	Jan. 21, 1851; antedated Dec. 31, 1850.
Stoves.....	Conrad Harris and Paul W. Goiner.....	Cincinnati, Ohio.....	Jan. 28, 1851.
Stoves.....	Seth Williams, assignor to William Bird & Co.....	Nashua, N. H.; N. Chelmsford, Mass.....	April 8, 1851.
Stoves.....	James V. De Witt.....	Buffalo, N. Y.....	July 8, 1851.
Stoves.....	Samuel W. Gibbs, assignor to Jagger, Tredwell, and Perry.....	Albany, N. Y.....	April 8, 1851.
Stoves, air tight.....	N. P. Richardson.....	Portland, Maine.....	April 1, 1851.
Stoves, air tight.....	Frederick Schultz.....	Philadelphia, Pa.....	April 1, 1851.
Stoves, cooking.....	S. W. Gibbs, assignor to North, Har- rison, and Chase.....	Albany, N. Y.; Philadelphia, Pa.....	July 8, 1851.
Stoves, cooking.....	John F. Rathbone.....	Albany, N. Y.....	July 8, 1851.
Stoves, cooking.....	William C. Davis.....	Albany, N. Y.....	July 8, 1851.
Stoves, cooking.....	Sam. W. Gibbs, assignor to Jagger, Tredwell, and Perry.....	Cincinnati, Ohio.....	Jan. 1, 1851.
Stoves, cooking.....	Sam. A. House.....	Albany, N. Y.....	Jan. 21, 1851.
Stoves, cooking.....	S. H. Sailor, assignor to Warwick, Seibrand & Co.....	Mechanicsville, N. Y.....	Feb. 4, 1851.
Stoves, cooking.....	Dutce Arnold.....	Philadelphia, Pa.....	Feb. 25, 1851.
Stoves, cooking.....	John Abendroth.....	Providence, R. I.....	April 15, 1851.
Stoves, cooking.....	John F. Rathbone.....	Port Chester, N. Y.....	April 15, 1851.
Stove doors and panels.....	M. C. Burleigh.....	Albany, N. Y.....	July 8, 1851.
Stove fronts.....	Somersworth, N. H.....	Somersworth, N. H.....	May 13, 1851.
Stove, parlor.....	Ezra Ripley.....	Troy, N. Y.....	Sep. 30, 1851.
Stoves, parlor.....	signors to Lowe and Hicks.....	Troy, N. Y.....	Nov. 25, 1851.
Stoves, parlor.....	Joseph Pratt.....	Boston, Mass.....	July 8, 1851.
Stoves, parlor, plates of.....	Apollos Richmond, assignor to A. C. Barstow & Co.....	Providence, R. I.....	July 15, 1851.
Stove or furnace for a ventilating.....	E. P. Penniman, assignor to H. Rutan.....	Rochester, N. Y.; Coburg, Canada.....	Sep. 16, 1851.
Stove plates.....	Lyman S. Hapgood.....	Boston, Mass.....	June 3, 1851.
Stove plates.....	Elijah P. Penniman.....	Rochester, N. Y.....	July 15, 1851.
Stove plates.....	Elijah P. Penniman.....	Rochester, N. Y.....	July 15, 1851.

Stove, plates of, Franklin.....	John F. Rathbone.....	Albany, N. Y.....	July 8, 1851
Stove registers.....	David Stuart and Jacob Beesley, assignor to W. P. Cresson.....	Philadelphia, Pa.....	Dec. 2, 1851.
Stove plates.....	Calvin Fulton.....	Rochester, N. Y.....	Sep. 2, 1851.
Stove plate, parlor.....	Apollos Richmond, assignor to A. C. Barstow & Co.....	Providence, R. I.....	Nov. 18, 1851.
Stoves, parlor.....	Samuel A. House.....	Mechanicsville, N. Y.....	Feb. 4, 1851.
Table.....	Nathan Chapin.....	Syracuse, Onondaga co., N. Y.....	Sep. 30, 1851.
Tomb, cast iron.....	H. K. Finchbaugh.....	Conestoga, Pa.....	June 22, 1851.
Umbrella stands.....	Edward J. Delany, assignor to Hareis and Adamson.....	Philadelphia, Pa.....	Feb. 18, 1851.
Water coolers.....	W. Burnett.....	Cincinnati, Ohio.....	July 8, 1851.

PATENTS EXTENDED DURING THE YEAR 1851.

Inventions or discoveries.	Patentees.	Residence.	Date of original patent.	Term of extension.
Brick machines.....	Nathaniel Adams.....	Cornwall, Orange co., Ct.....	Sept. 8, 1837.	7 y'rs from Sept. 8, 1851.
Car, railroad, supporting bodies.....	Richard Inlay.....	Philadelphia, Pa.....	Sept. 21, 1837.	7 ...do...Sept. 21, 1851.
Horse rake.....	Thos. D. Dewey, adm. of David Dewey.	East Poutney, Vt.....	Nov. 23, 1837.	7 ...do...Nov. 23, 1851.
Looms.....	Edson Fessenden, conservator of Wm. Crampton.....	Hartford, Ct.	Nov. 25, 1837.	7 ...do...Nov. 25, 1851.
Loom power for weaving coach-lace.....	Erastus B. Bigelow.....	Clinton, Mass.....	Apr'l 20, 1837.	7 ...do...Apr'l 20, 1851.
Plough.....	Bancroft Woodcock.....	Late of Mt. Pleasant, Pa., now of Wheeling, Va.....	June 14, 1837.	7 ...do...June 14, 1851.
Pressing cloth, paper, &c.....	Moses Bailey.....	Salisbury, Mass.....	July 5, 1837.	7 ...do...July 5, 1851.
Spinning woollen roving.....	C. H. Titcomb, adm'r of E. M. Titcomb, deceased.....	Late of Andover, Mass.....	July 29, 1837.	7 ...do...July 29, 1851.
Threshing and cleaning grain, machine for	John A. & Hiram A. Pitts.....	Springfield, O., and Alton, Ill.	June 29, 1837.	7 ...do...June 29, 1851.

V.—*Classified list of patents, &c.*—Continued.

ADDITIONAL IMPROVEMENTS GRANTED DURING THE YEAR 1851.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.	Improvements added.
Churns.....	John O'Neil.....	Xenia, Ohio.....	July 30, 1850.	May 13, 1851.
Bedsteads.....	Henry Pace, sen.....	Cincinnati, Ohio.....	Dec. 10, 1846.	Nov. 4, 1851.
Dye-stuff from spent madder, preparation of.....	Frederick Pfanner.....	Providence, R. I.....	Sept. 13, 1845.	Sept. 2, 1851.

DISCLAIMERS ENTERED DURING THE YEAR 1851.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.	Disclaimers entered.
Crackers, cutting.....	William R. Nevins.....	New York, N. Y.....	Oct. 17, 1835.	June 6, 1851.
Hide-handling cylinders, beaters in.....	James R. Innis.....	Easton, Pa.....	Mar. 19, 1850.	Jan. 24, 1851.
Heddles wire, machinery for making.....	Abajah H. Williams.....	Utica, N. Y.....	Sept. 11, 1849.	Mar. 6, 1851.

VI.

Alphabetical list of patentees for the year 1851.

No.	Patentees.	Inventions or discoveries.	Class.
7896	Abbott, Theodore T.....	Tires for railroad car wheels.....	X.
368	Abendroth, John.....	Stoves, cooking.....	Design.
8501	Adams, Benjamin F.....	Cutters, cheese, butter, and bread.....	XVII.
	Adams, Calvin. (See John P. Sherwood.)		
8477	Adams, Henry W.....	Zinc, white, use of steam to make.....	IV.
	Adams, Nathaniel.....	Brick machine.....	Extension.
8091	Ahrens, Adolph F.....	Teeth, setting.....	XX.
8091	Ahrens, Adolph F.....	Teeth, setting.....	XX.
8282	Akins, William H., and J. D. Felthousen.....	Sewing machines.....	III.
8230	Akrill, John.....	Pottery and other ware, working clay for.....	XV.
8309	Allen, David.....	Washing machines.....	XVII.
8621	Allen, John.....	Teeth, mineral, setting.....	XX.
7897	Allen, John L.....	Carriage tops, raising.....	X.
8157	Allen, Nicholas T.....	Harvesters, grain.....	I.
8240	Ambrose, D. R., and O. L. Reynolds.....	Cloth-folding machines.....	III.
	American Paper-folding Co. (See Edward N. Smith.)		
8619	Ames, J., and G. L. Wright..	Ruling paper, machines for.....	XVIII.
362	Ames, Winslow, assignor to Hartshorn & Ames.....	Grates, parlor.....	Design.
429	Ames, W., assignor to Hartshorn & Ames.....	Stoves.....	Design.
8169	Anderson, Charles.....	Boilers, revolving.....	VI.
7981	Andrews, Elijah A.....	Trunk handles.....	XVI.
7905	Andrews, Joseph E.....	Steering apparatus.....	VII.
7865	Anthony, Charles I.....	Daguerreotype pictures.....	XVIII.
8502	Anthony, David, sen.....	Soythe fastenings, construction of.....	I.
7831	Armsby, Joshua M. C.....	Corn shellers.....	XIII.
8180	Armstrong, Samuel T.....	Gutta-percha hollow ware.....	IV.
8147	Arnold, Alonzo C.....	Bats for felt cloth, &c, crossing the fibres in forming.....	III.
367	Arnold, Dutee.....	Stoves, cooking.....	Design.
7934	Ashcroft, E. H.....	Boilers, steam, insulated fusible plug for.....	VI.
8198	Atwood, Charles.....	Hooks and eyes, wire.....	XXI.
	Atwood & Kellog. (See Chas. Todd.)		
8136	Avery, Cyrus.....	Horse power.....	XIII.
8045	Avery, Samuel.....	Blind slats, apparatus for operating.....	II.
7950	Avery, Thos. C.....	Electro-magnetic engines.....	VIII.
8067	Babcock, Robert G.....	Horse-shoe machine.....	II.
8320	Bacon, Geo., and Rd. Raven..	Piano fortes, horizontal, square.....	XVIII.
	Backus, Bacon & Co., assignors. (See Jere. D. Green.)		
8196	Bailey, T. R.....	Lathes.....	
7882	Baird, David.....	Mattresses, spring, for invalids.....	XIV.
	Baker, Wm. E. (See Grover & Baker)		XVII.
8553	Baldwin, Cyrus, assignor to Stark Mills.....	Looms for weaving bags.....	III.
8049	Ball, Jonathan.....	Light, means of renovating and correcting.....	XX.
369	Ball, Thomas.....	Bust of Jenny Lind.....	Design.
8344	Ball, William.....	Gold amalgamator.....	II.
8602	Ball, William.....	Pumps for elevating water mixed with mineral substances.....	XI.
8381	Banister, Isaac.....	Shoe latches.....	XVI.
7951	Banks, Joseph.....	Buildings, iron, connexion for the beams and columns of.....	IX.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8243	Bantz, Sidney A., and Wm. Andrews.....	Mills for grinding corn and cobbs.....	XIII.
8125	Barlow, Nelson.....	Planing machines.....	XIV.
8161	Barnes, William T.....	Wash boards.....	XVII.
8116	Barnhill, Jacob.....	Planters, seed	I.
8195	Barnum, Daniel.....	Hat bodies, machines for making.....	XXI.
8563	Barrows, Thomas.....	Cloth, machines for stretching and drying.....	III.
8262	Barsantee, John H.....	Knitting machines.....	III.
8520	Bascom, Alonzo.....	Yarns, sizing and dyeing, apparatus for.....	III.
8603	Bass, William L.....	Lock, chronometric.....	II.
8418	Batchelder, John M.....	Telegraph wires, insulators for.....	VIII.
372	Batchelor, Nathaniel A.....	Clock frames.....	Design.
	Bates, John W., assignor. (See L. Lillie.)		
8394	Bates, Robert.....	Stammering, instrument for the cure of.....	XX.
	Bayley, Moses.....	Pressing cloth, paper, &c.....	Extension.
8573	Beadleston, Ambrose S.....	Furnace, revolving reverberatory.....	II.
8504	Bean, Jonathan.....	Winnowing machines, screens of.....	I.
7923	Beardsley, Backus A.....	Stoves, cooking.....	V.
8098	Beardslee, George W.....	Planing machines.....	XIV.
8497	Beardsley, George W.....	Planing machines.....	XIV.
8426	Beatty, Charles H.....	Lock, door.....	II.
8503	Bee, Benjamin F.....	Planes, hand.....	XIV.
8140	Beech, Ralph B.....	Earthenwares, baked, ornamenting.....	XV.
7949	Beers, John D., and Isaac Winslow.....	Planing machines.....	XIV.
7937	Beers, Philo S.....	Irregular forms, machines for turning.....	XIV.
	Bell & Christie. (See Maria Vaughn.)		
	Bell & Christie. (See Maria Vaughn.)		
8574	Bell, Daniel D.....	Potato diggers.....	I.
7883	Bennet, Phineas.....	Pumps, rotary.....	XI.
8137	Bessemer, Henry.....	Cane juices, machines for expressing.....	IV.
8123	Biddle, William.....	Weighing machines for grain, self.....	XII.
7898	Bigelow, Erastus B.....	Looms for weaving piled fabrics.....	III.
7884	Bigelow, Erastus B.....	Looms for weaving tapestry carpets with particolored warp.....	III.
7982	Bigelow, Erastus B.....	Weaving, delivering particolored warps in.....	III.
7983	Bigelow, Erastus B.....	Looms, jacquard, for weaving cut-pile fabrics.....	III.
	Bigelow, Erastus B.....	Loom power for weaving coach lace.....	Extension.
8539	Bigelow, E. B.....	Woven fabrics, wires for making pile in.....	III.
7899	Billings, A. M.....	Hubs and axles, connecting and disconnecting.....	X.
195	Billings, Horace.....	Composition for covering hams, &c.....	Reissue.
	Bird, Henry M. (See Daniel Wilson, jr.)		
8105	Bissell, Levi.....	Springs, carriage.....	X.
8498	Bissell, Levi, assignor to Levi Bissell and Lyman Kinsley.....	Springs, carriage.....	X.
8086	Bixby, Rufus, Cyrus Bixby, and John Garst.....	Planing machines.....	XIV.
8184	Blanc, John.....	Hemp, manufacture of, from okra.....	III.
401	Blanchard, Reuben J., assign'r to Learned & Thatcher.....	Stoves.....	Design.
402	Blanchard, Reuben J., assign'r to Learned & Thatcher.....	Stoves.....	Design.
403	Blanchard, Reuben J., assign'r to Learned & Thatcher.....	Stoves.....	Design.
8440	Bliss, Alfred.....	Cans or canister, tops of.....	II.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
188	Blodget, Sherburne C., and John A. Lerow.....	Sewing machines.....	Reissue.
190	Boardman, Horace.....	Boiler, steam, and furnace thereof...	Reissue.
8215	Boardman, John.....	Washing machines.....	XVII.
8102	Boardman, Luther.....	Spoon, &c., manufacture of, wire strengthened.....	II.
8575	Bogart, C.....	Sounding boards for musical instruments, construction of.....	XVIII.
8441	Bogert, Charles A.....	Stoves, air heating.....	V.
8439	Bolen, John G.....	Burglar alarms.....	XXII.
8442	Boone, Thomas G.....	Ships' winches.....	VII.
8005	Boot, Henry.....	Cloth, machines for folding and measuring.....	III.
8508	Booth, Ezekiel, & Ezra Ripley.	Car seats.....	X.
8033	Booth, Jonathan L.....	Winnowing machines.....	I.
8216	Bottum, J. H.....	Lathes, securing pinions, &c., of watches in.....	XIV.
8114	Boyden, Otis.....	Alloys of iron, zinc, and nickel.....	IV.
8068	Boynton, Leander W.....	Bats for felting, making.....	III.
8287	Boynton, L. W.....	Wool, machines for cleansing.....	III.
8242	Boynton, N. A.....	Stoves, parlor cooking.....	V.
8365	Brandeis, L.....	Bronze powder, processes of making..	IV.
8404	Brett, Ephraim C.....	Flocks, machines for opening and cleaning.....	III.
7959	Brewer, William, and John Smith.....	Paper molds.....	III.
8133	Briggs, Joseph W.....	Collars for harness.....	XVI.
7965	Briggs, Luther, jr.....	Hammers, trip, method of adjusting the stroke.....	II.
8142	Brown, Charles F.....	Rudder, balanced.....	VII.
8164	Brown, Charles F.....	Masts and spars, telescopic connexion of.	VII.
	Brown, Daniel. (See Strevell & Brown.)		
	Brown, H. L. & C. P. (See Foster, Jessup, Brown & Brown.)		
	Brown, John. (See Guild & Brown.)		
8269	Brown, Luther.....	Brick machines.....	XV.
8383	Browne, L. H.....	Piano fortes.....	XVIII.
8319	Brown, Samuel.....	Kilns, lime.....	XV.
8421	Brown, Wm. H.....	Baths, shower.....	XX.
8217	Browning, Edwin K.....	Mattress-stuffing, &c., machines for cutting wood into shreds, and crimping them for.....	XVII.
8464	Brooks, Merrit S.....	Augers, &c., to their handles, means for attaching.....	XIV.
8036	Broquette, Charles A.....	Calico printing, material for transferring colors in.....	IV.
	Brundage, Edwin L. (See Stilwell & Brundage.)		
	Brundage, E. L. (See Ripley & Brundage.)		
8111	Brunk, Henry.....	Lap anvils for shoemakers.....	XVI.
8266	Bryan, Wm. H.....	Boats to facilitate the discharge of cargoes, &c., fittings for.....	VII.
8283	Bryant, M. C.....	Looms for weaving cut-pile fabrics.....	III.
8036	Buckingham, John, and Joseph H. Baird, assignor to Scovill Manufacturing Co..		
8443	Buffum, Arnold.....	Milling tool.....	II.
8321	Bulkley, Chas. S.....	Ore washer.....	II.
		Telegraphs, means for obviating difficulties arising from defective insulation..	VIII.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	Gaylor, Charles J., assignee of F. C. Goffin. (See F. C. Goffin).....		
346	Gibbs, Saml. W., assignor to Jagger, Treadwell & Perry.	Stoves, cooking.....	Design.
356	Gibbs, Saml. W., assignor to Jagger, Treadwell & Perry.	Stoves.....	Design.
357	Gibbs, Saml. W., assignor to Jagger, Treadwell & Perry.	Stoves.....	Design.
359	Gibbs, Saml. W., assignor to Jagger, Treadwell & Perry.	Stoves.....	Design.
366	Gibbs, Saml. W., assignor to Jagger, Treadwell & Perry.	Stoves.....	Design.
360	Gibbs, Saml. W., assignor to Jagger, Treadwell & Perry.	Stoves.....	Design.
345	Gibbs, Saml. W., assignor to North, Harrison & Co.	Stoves.....	Design.
422	Gibbs, Saml. W., assignor to North, Harrison & Chase..	Stoves.....	Design.
394	Gibbs, Saml. W., assignor to North, Harrison & Chase..	Stoves.....	Design.
8398	Giger, Benj. (See Jno. Cooper.)		
342	Gilbert, T.	Piano fortes.....	XVIII.
	Gilbert, Charles, and Mitchell G. Hallman, assignors to Charles Gilbert	Stoves.....	Design.
8311	Gillett, Bethuel, and Lyman Allis.....	Presses, self-acting, cheese.....	XII.
8069	Gilliland, Lewis L.	Splint machines.....	XIV.
8348	Gillespie, G. W. C.	Ploughs, wheeled, cultivating	I.
7871	Gilman, Samuel H.	Valves, side, method of connecting the, with the rock-shaft	VI.
7987	Gilman, Samuel H.	Cut-off, adjustable.....	VI.
8466	Gilman, Samuel H.	Bagasse, machines for drying	V.
8559	Goffin, F. C., ass'r to Charles J. Gaylor	Lock, for safes, &c.....	II.
8524	Goldson, Henry	Ploughs	I.
8544	Goldthait, Elijah	Plough.....	I.
7927	Goodrich, Leonard.....	Ships, light.....	VII.
8075	Goodyear, Nelson.....	India rubber, manufacture of.....	IV.
	Goodyear, Nelson. (See Ed. Hamilton.)		
8285	Gordon, George P.	Printing presses.....	XVIII.
8080	Gorrie, John	Ice, process for artificial production of..	XXII.
8065	Goshon, Joseph G., & Wm. H. Towers.	Writing, apparatus for giving ease to the arm in.	XVIII.
8363	Goulding, Henry.....	Stone-drilling machine.....	XV.
8268	Graham, William.....	Tuyer, tight joint for	II.
7973	Granger, Rensselaer D.	Stoves, air-tight Franklin.....	V.
8050	Grannis, Charles W.	Stoves, cooking	V.
8093	Giant, Joseph	Brick presses	XV.
8019	Grass, H., & Wm. Campbell.	Bedstead rails, machines for cutting screws on	XVII.
8352	Gray, James A.	Piano forte action.....	XVIII.
8284	Gregg, Isaac.....	Brick machines.....	XV.
8158	Gregg, Mahlon	Brick machines.....	XV.
8345	Gregory, Alfred	Equalizers, or power-regulators	VI.
7975	Greer, Jas., & Rufus J. King.	Stoves, cooking	V.
	Green, H. H. (See John J. Sturgis.)		
428	Green, Jeremiah D., assignor to Backus, Bacon, & Co.	Stoves.....	Design.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	Greenwood, M., & Co., ass'ees. (See Charles Zeuner.)		
8485	Griffith, Levi B.	Iron, measuring and cutting	II.
8166	Griggs, George S.	Locomotives, running-gear of	X.
8374	Grimes, Owen W.	Hemp and flax, machines for scutching and hackling	III.
8375	Grosvenor, L. D.	Broom corn, machines for stripping seed from	I.
7872	Grosvenor, Lorenzo D.	Broom corn, machines for assorting	I.
7931	Grover, Wm. O., and Wm. E. Baker	Sewing machines	III.
8152	Guard, Chauncey H.	Springs, carriage	X.
8103	Guild, Charles M., and John Brown	Steam traps	V.
7971	Guyer, Hugh.	Window curtain fastening	XVII.
7901	Gwynne, J. Stuart	Pumps, rotary	XI.
	Haigh, Jos. P., A. Hartupee, and J. Morrow, assignees. (See William Kenyon.)		
8257	Hall, William	Lock, bank, powder-proof	II.
	Hallman, Mitchell G. (See Gilbert & Hallman.)		
331	Hallman, W. G.	Stoves	Design.
8121	Hamilton, Ed., assignor to N. Goodyear	Dust, excluding from railroad cars	V.
8422	Hammer, George	Corks, machines for cutting	XXII.
8486	Hammitt, John T.	Desks	XVII.
7917	Hanley, James	Key, swivel-nibbed	II.
8037	Hanon, Valcke E. T.	Mill-stones	XIII.
378	Hapgood, Lyman S.	Stove plates	Design.
8204	Happerset, David J.	Hooker-up, mechanical	II.
8342	Hardaway, Moore	Spike machines, hook-heading, motion for	II.
8525	Hardie, James	Propellers of machinery, to be used in currents	XI.
8332	Harris, C., and P. W. Zoiner.	Stoves, double-oven	V.
347	Harris, Conrad, and Paul W. Zoiner	Stoves	Design.
7902	Harris, Joseph, jr.	Motion, changing reciprocating into a rotary	XIII.
	Harrison, H. (See Dawes and Harrison.)		
8312	Harrison, James	Dental hydraulic cups	XX.
7988	Hastings, Eliakim M., and John Shepherdson	Looms, cylinders for figuring	III.
	Hartshorn and Ames. (See Winslow Ames.)		
	Hartshorn, J., and W. Ames, assignees. (See W. Ames.)		
7920	Hathaway, Alfred	Pens for ruling paper	XVIII.
375	Hathaway, William L.	Stoves	Design.
8445	Hathaway, John R., and Jno. P. Strippel	Printing presses	XVIII.
8167	Hatch, Thatcher C.	Ventilators	V.
8245	Hawkins, Wm.	Stave dressing machines	XIV.
8588	Hausknecht, Gustavus L.	Carriages	X.
8221	Hausknecht, Gustavus L.	Springs, carriage	X.
8159	Hayden, Hiram W.	Dies, construction of	II.
8589	Hayden, Hiram W.	Kettles and articles of like character from discs of metal, machinery for making	II.
8364	Hazard, E. W., C. H. Jenner.	Millstones, machine for dressing	XIII.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	Healy, Darius. (See Dana, Healy, and Cummings.)		
8106	Hebbard, Albert	Wheels, cast-iron car	X.
8056	Hedge, Samuel, assignor to George W. Hedge	Saw-mills	XIV.
7994	Heffley, George, Samuel Conrad, and James Wigle	Ploughs, adjustable land sides of	I.
8205	Heinemann, H.	Buttons, silk covered	XXI.
	Heins & Adamson. (See Ed. J. Delany.)		
8467	Hendrix, Davis R.	Boot-trees	XVI.
	Herring, Silias C., and John Ryer, assignees. (See Frederick Fitzgerald.)		
8015	Heywood, Simeon	Wheels and axles, connecting and disconnecting	X.
189	Hibbard, Harmon, assignor to W. W. Reid	Tanning processes	Reissue.
8222	Hibbard, Harmon, assignor to Jared A. Hibbard	Buggy tops	X.
8168	Hickok, W. O.	Ruling machines, regulators for the pen beam in	XVIII.
8046	Hill, Charles F., and Henry Hoffman	Marble ornamenting	XV.
8144	Hill, Thomas W.	Comb-cutting machine	XXI.
8185	Hinds, William	Saw-set, vice	XIV.
8560	Hinkley, Benjamin	Trucks, railroad car	X.
8333	Hobbs, Charles	Stereotype plates, moulding and casting	XVII.
8526	Hodge, Nehemiah	Wheels, railroad car	X.
	Hoffman, Henry. (See Hill and Hoffman.)		
7954	Hoguet, Francis	Tables, extension	XVII.
8272	Holden, Moore	Millstones, dressing	XIII.
8026	Holkins, Elijah S.	Saw-set	XIV.
8008	Hollingsworth, Jehu	Wheat fans	I.
8061	Hollingsworth, Jehu	Smut machines	XIII.
8527	Hollingsworth, Jehu	Mill for grinding and bolting	XIII.
8206	Holly, B., and J. B. Wheeler.	Grooving lumber, machine for	XIV.
8264	Horner, David	Seed planter	I.
8307	Hosley, Abijah S.	Ship's model measurer	VII.
8087	Hoskyns, Chandos	Rudder, apparatus for relieving the helmsman from the shock of	VII.
8606	Hotchkiss, Julius, assignor to the Hotchkiss and Merri- man Manufacturing Co.	Suspenders	XXI.
8348	House, Samuel A.	Stoves, cooking	Design.
7349	House, Samuel A.	Stoves, parlor	Design.
8388	House, Samuel A.	Stoves	Design.
8540	Howe, Elias, jr.	Fastening for garments	XXI.
4969	How, Thomas P.	Trucks, connecting them with car bodies	X.
239	Hoyt, William H.	Omnibus steps	X.
834	Hubbard, M. G.	Springs, carriage	X.
8193	Hubbell, William W.	Fire-arms	Reissue.
146	Hudson, S. A.	Sword canes	XXI.
	Hughes, James. (See Carr & Hughes.)		
1830	Hulings, Margaret	Spinning wool, hand machines for	III.
8107	Hunniston, Wilhs.	Candle making apparatus	IV.
838	Hunt, Marshall J.	Planters, seed, gearing of	I.
6100	Huntley, Hosea H.	Stoves, cooking	V.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8541	Huntley, Hosea H.	Stoves, cooking.	V.
8355	Hurlbut, C. R.	Gauges used in turning	XIV.
7928	Hurlbut, Sidney S.	Harvesters, grain.	I.
8131	Hutchins, Samuel B.	Crank indicator, arrangement of machinery for actuating the.	VI.
371	Hutchinson, James, assignor to D. A. E. and N. Powers. . Hutchinson, A. B. and C. E. (See J. F. Ostrander.)	Floor oil-cloth.	Design.
411	Hutchinson, James, assignor to Deborah, Albert E., and N. B. Powers.	Floor oil-cloth.	Design.
374	Hutton, P. M.	Bedsteads.	Design.
407	Hutton, Pelatiah M.	Bedsteads, cast iron.	Design.
	Hyde, J. B. (See Thos. R. Williams.)		
8580	Hyde, Jos., assignor to Thos. J. Eddy.	Lathes, chucks for.	XIV.
	Imlay, Richard	Car, railroad, supporting, bodies.	Extension.
8608	Ingalls, Gustavus W.	Æolian attachment.	XVIII.
8487	Ingalls, J. K.	Radiating surfaces.	V.
	Innis, James R.	Hide handling cylinders, beaters in.	Disclaimer.
8336	Irwin, William.	Vessels, method of raising sunken.	VII.
8289	Ison, Mark M.	Spike machines.	II.
	Jagger, Treadwell, & Perry. (See Samuel W. Gibbs.)		
8107	Jefferson, Purnel.	Spike machines, gauging and heading movement for.	II.
8247	Jenkins, J.	Gauges, feather edging, for shoemakers.	XVI.
7974	Jenkins, Solon, jr.	Daguerreotypes, securing, in monumental stones.	XVII.
	Jessup, G. (See Foster, Jessup, Brown, & Brown.)		
8368	Jillson, A.	Weavers' temples.	III.
8402	Jimason, Alexander.	Valves, shields for.	XI.
8101	Jobson, Robert.	Fire-places, reflecting.	V.
	Johns, George J. (See Schofield & Johns.)		
	Johnson, E. (See Cox, Johnson, & Cox.)		
8281	Johnson, John, assignor to Elias Johnson.	Looms for weaving pile fabrics.	III.
8511	Johnston, A. W.	Felloes, bending.	X.
408	Jones, Anthony W., assignor to Jas. McGregor, jr.	Stoves.	Design.
8009	Jones, Gilbert D.	Mills for grinding paints and drugs.	XIII.
7906	{ Jones, John.	Carriages.	X & re-issue.
191			
7924	Jones, Thomas W.	Hides, machines for preparing.	XVI.
8234	Jones, John.	Carriage bodies, hanging.	X.
8236	Jones, John.	Carriage bodies, hanging.	X.
8357	Jones, S. T.	Iron, manufacture of.	II.
8267	Jones, Wm. R.	Hubs for boxes, machine for preparing.	X.
8207	Jones, William.	Harvesting machines.	I.
8273	Judd, Albert H.	Indicator, water-level, for steam boilers.	VI.
7960	Judson, Junius.	Power governors.	XIII.
	{ Judkins, Chas. T.	Weavers' treadles.	II.
7939	{ Patented in England to David Christie.		
8076	Kain, James R., and Spencer Lewis.	Bedstead fastening.	XVII.
7873	Kaufman, Abraham.	Quilting frames, and apparatus.	XVII.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	Keenan, Chas. (See C. Wet- terstedt.)		
8334	Kempton, Jas. C.	Drying and oxidizing colored goods....	IV.
8427	Kenyon, William, assignor to Jos. P. Haigh, A. Hartu- pee, and J. Morrow	Nut-washers, etc., machines for making.	II.
8353	Kerrison, R. M.	Piano forte action....	XVIII.
8581	Ketcham, Charles	Saw-mills, feeding logs in.....	XIV.
206	Ketchum, Wm. F.	Mowing machine.....	Reissue.
8415	Killin, P.	Ovens, portable elevated.....	V.
8545	King, Daniel.....	Sugar drainers, centrifugal.....	IV.
8446	King, James T.	Washing apparatus.....	XVII.
8609	King, Lewis.....	Carriages.....	X.
	King, Rufus J. (See Greer & King.)		
8208	King, William.....	Cork cutting machine.....	XXII.
7921	Kinnear, Delamar.....	Lamps, lard.....	V.
8248	Kirk, S. W.	Bran dusters.....	XIII.
8512	Kitson, Rd.	Card grinders.....	III.
8002	Klepfer, Henry.....	Piano fortes, upright.....	XVIII.
7916	Knapp, Moses L.	Supporters, abdominal.....	XX.
8020	Knight, Geo. H.	Paving, &c., stone and metal conglome- rate for.....	IX.
8468	Knowles, S. W.	Cradles, swinging.....	XVII.
8187	Kraft, Benjamin.....	Boxes and axles for saving oil.....	XIII.
8038	Krauser, John.....	Railings, iron.....	IX.
7995	Krebs, Charles W.	Shutters, apparatus for securing in any required position.....	II.
8350	Kreter, Randolph.....	Piano forte, action.....	XVIII.
7874	Lamb, John, and C. H. Root.	Wheels, spring, carriage.....	X.
344	Lamb, Joseph G.	Stoves.....	Design.
386	Lamb, Joseph G.	Stoves.....	Design.
387	Lamb, Joseph G.	Stoves.....	Design.
7989	Lamson, Ebenezer G.	Scythe fastenings.....	I.
8000	Lamson, Nathaniel.....	Scythe fastenings.....	I.
8003	Lamson, Nathaniel.....	Scythe fastenings.....	I.
7956	Lane, Abner.....	Irregular forms, machinery for turning.	XIV.
203	Larkin, Esther L., adm'x of John E. Larkin, deceased...	Augers, method of attaching to their handles.....	Reissue..
8469	Latourette, David L.	Oil presses.....	XII.
8347	Laurence, Erastus.....	Washing machines.....	XVII.
8238	Lawrence, James A., assignor to Roberts & Lampson....	Harness, saddle trees for.....	XVI.
8193	Lazell, A. E., and D. Lazell.. Learned & Thatcher. (See R. Blanchard.)	Bread cutters.....	XVII.
	Learned & Thatcher. (See R. Blanchard.)		
	Learned & Thatcher. (See R. Blanchard.)		
	Lee, Robert, and Thomas G. Clinton. (See McGregor, Lee & Clinton.)		
8528	Lemmer, Adam.....	Cannon for throwing chain shot.....	XIX.
8428	Levington, Robert.....	Axle boxes for railroad cars.....	X.
8416	Lewis, Spencer.....	Bedsteads, machines for cutting screws on rails of.....	XVII.
	Lewis, Spencer. (See Kain & Lewis.)		
360	Lewis, W. & W. H.	Pedestals and columns.....	Design.
8181	Lewis, Wm. & W. H.	Fastening pedestals to columns.....	XVII.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8235	Lewis, Wm. & W. H.....	Daguerreotype plates, apparatus for buffing.....	XVIII.
8513	Lewis, Wm., Wm. H., & H. J.....	Daguerreotype apparatus.....	XVIII.
8590	Lewis, Wm. & Wm. H.....	Lenses, adjusting.....	XVIII.
8095	Leypold, Frederick.....	Scarificators.....	XX.
8223	Lilley, Louis, assignor to Jno. W. Bates.....	Safes, fire-proof.....	II.
8390	Litchfield, Laroy.....	Weavers' shuttles.....	III.
8047	Littlefield, Dennis G.....	Stoves, cooking.....	V.
8514	Livermore, Lorenzo D.....	Cars, railroad, coupling.....	X.
8391	Livingston, N. B.....	Weighing carts.....	XII.
	Lombard & Lombard. (See R. G. Westacott.)		
8301	Long, Richard.....	Brick machines.....	XV.
8515	Lonsbury, Allen J.....	Supporter, abdominal.....	XX.
8039	Loper, Richard F., and John W. Nystrom.....	Steam engines.....	VI.
	Low & Hicks, assignees. (See Ripley, Ezra, and N. S. Vedder.)		
8447	Luttgens, H. A.....	Engines, apparatus for regulating the speed of.....	VI.
8290	Lyman, A. S.....	Boilers, steam, water-gauge for.....	VI.
194	Lynch, Edward.....	Evaporators and condensers.....	Reissue.
8566	Maginnis, James.....	Tailors' measures.....	XXI.
7886	Maguire, William.....	Staves, machines for jointing.....	XIV.
8529	Malo, Gaspard.....	Propeller, screw.....	VII.
7875	Manning, James.....	Candlesticks.....	V.
8385	Manny, J. H.....	Harvesters, mowing machines and.....	I.
8448	Marcher, Robert.....	Enamelling mouldings, &c., machinery for.....	XVIII.
8040	Marsh, James S.....	Stoves, cooking.....	V.
8591	Marsh, Nathan B.....	Stethoscopes.....	XX.
7887	Marston, Stanhope W.....	Lock-fly, tumblers for fire-arms.....	XIX.
8023	Mason, Lewis J.....	Table leaves, fastening down of.....	XIV.
8302	Mason, Nicholas.....	Ranges, cooking.....	V.
	Massachusetts Arms Co., assignees. (See Joshua Stevens.)		
8417	Masserano, Clement, assignor to Clement Masserano, Josephine Wickliffe, admx. of R. Wickliffe, jr., deceased, Charles Carenzi, André Crestadora, Pellegró Rocca, and Lewis B. Migone.	Locomotives moved by the power of animals.	X.
8470	Mathushek, Frederick.....	Piano fortes.....	XVIII.
8126	Maynard, Edward.....	Fire-arms, breech loading.....	XIX.
8291	McAdams, John.....	Account books, machine for numbering the pages of.....	XVIII.
8224	McCallum, D. C.....	Bridge, counter braces adjusting the effective length of.....	IX.
8256	McCarty, James.....	Boiler-tubes, &c., spring expanding swage for.....	VI.
8324	McCloskey, D. W. C.....	Lamps, self-acting blow-pipe.....	V.
8492	McConnell, W. P.....	Charcoal, manufacture of.....	V.
8016	McCurdy, David.....	India rubber, manufacture of.....	IV.
7903	McFarlane, George R.....	Wheels, cast-iron car.....	X.
8124	McFarlan, William A., and Thomas C. Carpenter.....	Bran dusters.....	XIII.
8314	McGregor, Geo, Robert Lee, and Thos. G. Clinton.....	Padlock.....	II.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	McGregor, Jas., jr., assignee. (See Anthony Jones.)		
8010	McKinlay, Peter.....	Hullers, rice.....	X.
8610	McLain, John.....	Harness, saddles.....	XVI.
8449	Meech, Charles L.....	Wind instruments, the mouthpiece for	XVIII.
8017	Mellish, Henry.....	Splint machines.....	XIV.
8303	Mercer, John.....	Fulling vegetable and other textures, chemical processes for.....	III.
410	Merchant, Silas.....	Stoves.....	Design.
207	Merrick, Solyman.....	Screw wrench.....	Reissue.
8376	Merrell, William.....	Lath machines.....	XIV.
8031	Merrill, Rosewell T.....	Grain separators and fans.....	I.
8450	Miller, James M.....	Sugar vacuum pans.....	IV.
8194	Miller, Michael.....	Piano fortes.....	XVIII.
8225	Miller, Sylvanus.....	Harvesting machines, rake to.....	I.
8500	Milligan, Wm. B.....	Hides, bating and tanning.....	XVI.
8226	Milligan, William E.....	Boilers, steam, arrangement of the flues and water spaces of.....	VI.
	Mitchell, Wm., assignee of J. Steger. (See Steger, Jos.)		
8175	Moeser, Henry.....	Printing names of subscribers on news- papers, &c.....	XVIII.
8011	Monson, Charles.....	Blasting rocks.....	IX.
8265	Moore, Henry.....	Hubs for the reception of boxes, ma- chine for preparing.....	X.
8561	Moore, Jos. H., and Wm. P. Parrott.....	Carriages, steam, for railways.....	X.
8392	Moore, William.....	Presses, self-acting.....	XII.
	Morse, Joel R. (See Jabez Robins.)		
8546	Mortimer, Thos. H., and Jas. M. Gardiner.....	Rudders, method of operating.....	VII.
8335	Moulson, John.....	Photographic purposes, mercury bath for.....	XVIII.
425	Muller, Charles.....	Hat stand.....	Design.
8410	Murrill, Jas. H.....	Locomotives, running gear of.....	X.
8177	Myers, Laurence.....	Cars for the transportation of coal, im- provements in.....	X.
8451	Nebinger, William.....	Cars, railroad, running gear of.....	X.
7888	Neely, Edward.....	Harvesters, grass.....	I.
7989	Neff, Jacob.....	Electro magnetic engines.....	VIII.
8424	Nesmith, John, and Wesley Sawyer.....	Shawls, &c., machines for twisting fringes of.....	III.
	Nevins, William R.....	Crackers, cutting.....	Disclaimer.
8110	Newbury, Bolivar.....	Jacks, lifting.....	XII.
8516	Newcomb, Levi, jr.....	Bedsteads.....	XVII.
208	Newell, Robert.....	Manifold permutation locks.....	Reissue.
8145	Newell, Robert.....	Locks, permutation safety.....	II.
8425	Newlove, William.....	Mills, grinding.....	XIII.
8078	Newman, Nelson.....	Pumps.....	XI.
8452	Newton, Henry J.....	Piano forte strings.....	XVIII.
8547	Newton, Orin.....	Door knobs, manufacture of.....	II.
8396	Nicholson, Thomas.....	Lock meze.....	II.
8315	Niles, Peter H.....	Tool haft, adjustable.....	XIV.
8611	Nims, Samuel D.....	Sashes, window, method of hanging...	II.
8567	Noel, Theodore.....	Watches, winding.....	VIII.
8530	Norris, J. H., & D. Flanders. North, Harrison, & Co. (See Samuel W. Gibbs.)	Desks.....	XVII.
	North, Harrison, & Chase. (See S. W. Gibbs.)		

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	North, Harrison, & Chase. (See Samuel H. Sailor.)		
	North, Harrison, & Chase, assignee. (See S. W. Gibbs.)		
7876	Northrop, Sheldon	Looms for weaving seamless bags	III.
7996	Norton, Michael	Sash lock	II.
7961	Nystrom, John W.	Calculating machines	VIII.
	Nystrom, John W. (See Loper & Nystrom.)		
7962	O'Neill, Bernard	Boilers, method of bracing the water spaces of	VI.
97	O'Neil, John	Churns	Add'l imp't.
8153	O'Neil, John	Washing machines	XVII.
8377	O'Neil, Patrick	Easy chairs for invalids, etc.	XVII.
7932	Osborn, John	Hydraulic rams, operating the waste gate in	XI.
8135	Osborn, Joseph	Sash stopper	II.
8096	Osgood, James W.	Coupling, compound for hose or pipe..	XI.
8313	Ostrander, Jona. F., assignor to A. B. & C. E. Hutchinson.	Harrows, rotary	I.
8316	Otis, George W.	Lightning rods, insulators for	VIII.
99	Pace, Henry Sen'r.	Bedsteads	Add'l imp'ts.
8191	Paine, John P.	Spectacle frames	VIII.
8034	Paine, Rufus R.	Stoves, cooking	V.
8192	Palmer, A., & S. G. Williams.	Harvesters, grain	I.
	Palmer, Courtland. (See H. Smith.)		
8227	Panton, William	Leather, machines for splitting	XVI.
7910	Parker, E. T.	Plough stock, convertible	I.
8429	Parker, James L.	Water-wheels	XI.
8398	Parsons, Lemuel H.	Plotting scales	VIII.
8128	Past, John C.	Switch for railroads, self-adjusting and locking	X.
8292	Pattinson, H. L.	Pigments, manufacture of	IV.
8612	Patton, James M., and Wm. F. Fergers, assignors to John C. Da Costa	Planing machine, cutters for	XIV.
8471	Pease, Webster H.	Kettles with spouts, method of moulding.	II.
8548	Peck, Milo	Presses, drop	XII.
397	Penniman, Elijah P.	Stove plates	Design.
398	Penniman, Elijah P.	Stove plates	Design.
414	Penniman, E. P., assignor to H. Ruttan	Stove or furnace, for a ventilating	Design.
7890	Pennington, Cunningham M. .	Bridge trusses, arrangement of arches in.	IX.
7930	Pennock, Samuel and Morton.	Planter, seed, seeding apparatus of a...	I.
8209	Pennock, Samuel and Morton.	Seeding machines	I.
7945	Pepper, John, assignor to Charles Warren and Ho- ratio G. Sanford	Knitting machines	III.
8172	Pepper, John, assignor to Ho- sea Crane, John Pepper, and J. G. Crane	Knitting machines	III.
8592	Pepper, John Paige	Jasper, mineral composition resembling.	XVIII.
8506	Perry, George W.	Looms, shuttle motion of	III.
351	Perry, John S.	Stoves	Design.
8304	Person, Ira B., and Joel L. Brocket	Omnibus drivers, registers for	X.
98	Pfanner, Frederick	Dye stuffs from spent madder, prepara- tion of	Add'l imp't.
	Phalen, J., assignee. (See Jacob Worms.)		
196	Phelps, James	Paper rags, machines for cleaning	Reissue.
8531	Phillips, David F.	Switch, railroad	X.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8549	Phillips, David F.....	Mills, cider.....	XIII.
	Pierce, Samuel. (See Shields & Pierce.)		
8104	Pierce, Samuel.....	Furnaces, hot-air.....	V.
	Pitts, Hiram A., and John A.	Threshing and cleaning grain, machine for.....	Extension.
8097	Platt, Nelson.....	Smut machines.....	XIII.
7946	Pond, Moses.....	Ranges, cooking.....	V.
8210	Porter, P. W.....	Fire-arms, revolving breech.....	XIX.
8582	Porter, Samuel.....	Ores, minerals, &c., arrangement of pans for washing.....	II.
7940	Post, William.....	Doors or shutters, attachment for opening or closing.....	II.
8171	Postley, Charles A.....	Frog-guard, self-acting.....	IX.
7970	Potter, Nathaniel.....	Bee-hives, use of slides in.....	I.
	Powers, D., A. E., and N. (See James Hutchinson.)		
8405	Pratt, D. and R.....	Flocks to cloth, apparatus for applying.	III.
	Pratt, David. (See Wager, Pratt & Richmond.)		
361	Pratt, Joseph.....	Grates, parlor.....	Design.
391	Pratt, Joseph.....	Stoves, parlor.....	Design.
8399	Prince, N. A.....	Pens, fountain.....	XVIII.
8113	Putnam, George W.....	Saw-filing machinery, vice-jaw for.....	XIV.
6403	Putnam, Joseph.....	Clay pipes, manufacture of.....	XV.
8041	Putnam, S. S.....	Window curtain fixtures.....	XVII.
8186	Race, W.....	Sash, upper, arrangement of catches in the, operated by moving the lower sash.....	II.
8387	Race, Washburn.....	Fasteners, blind or shutter.....	II.
8557	Raines, William N.....	Switches, railroad.....	X.
	Randall, S. (See Treat & Randall.)		
384	Rathbone, John F.....	Stoves.....	Design.
389	Rathbone, John F.....	Stoves, cooking.....	Design.
395	Rathbone, John F.....	Stoves, cooking.....	Design.
396	Rathbone, John F.....	Stoves, plates of Franklin.....	Design.
8532	Redick, William.....	Seed planters.....	I.
	Rees, James. (See Carter & Reese.)		
	Reid, W. W. (See Harmon Hibbard.)		
8453	Remy, Benjamin W.....	Excavating machines.....	IX.
8613	Renton, James.....	Iron, wrought, direct from the ore, apparatus for making.....	II.
	Renwick, E. S. (See Watson, Renwick & Watson.)		
184	Reynolds, Edward.....	Felloes for the wheels of carriages and wagons, machine for setting or bending.....	Reissue.
8051	Reynolds, James.....	Gutta percha tubing and covering wire, machines for.....	IV.
	Reynolds, O. L., and D. R. Ambrose. (See Ambrose & Reynolds.)		
7941	Rhoades, Philip, jr.....	Snatch-block.....	VII.
6478	Rice, E.....	Baby-jumpers.....	XXII.
8094	Rich, Martin.....	Saw-mills.....	XIV.
8251	Richardson, Aaron.....	Oil-cups for journal boxes.....	XIII.
8325	Richards, William T.....	Springs, machinery for forming joints of elliptical.....	II.
8369	Richardson, A.....	Leather and splitting machines.....	XVI.

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No.	Patentees.	Inventions or discoveries.	Class.
8146	Richardson, Ithiel S.....	Churns.....	I.
376	Richardson, N. P.....	Stoves.....	Design.
363	Richardson, N. P.....	Stoves, air-tight.....	Design.
399	Richmond, Apollos, assignor to A. C. Barstow & Co....	Stoves, parlor, plates of.....	Design.
424	Richmond, Apollos, assignor to A. C. Barstow & Co....	Stove, plates, parlor.....	Design.
	Richmond, Volney. (See Wa- ger, Pratt & Richmond.)		
8593	Rickards, David H., and Jo- seph F. Flanders	Locks, rotating tumbler.....	II.
8517	Rickey, Richard.....	Collars, horse.....	XVI.
8231	Riddle, John J.....	Brick machines.....	XV.
8021	Riddle, John J.....	Brick presses.....	XV.
8533	Riley, Wm. Willshire.....	Teeth, porcelain, inserting.....	XX.
8090	Ripley, Ezra.....	Hinge crane, for doors, shutters, &c... ..	II.
377	Ripley, Ezra, assignor to D. Stafford & Co.....	Stoves.....	Design.
8293	Ripley, Ezra.....	Grinders, method of forming teeth upon cast-iron.....	XIII.
416	Ripley, Ezra.....	Stove fronts.....	Design.
421	Ripley, Ezra, assignor to Chollar, Sage & Dunham...	Stove	Design.
426	Ripley, Ezra, and N. S. Ved- der, ass'rs. to Low & Hicks.	Stove, parlor.....	Design.
8583	Ripley, E., & E. L. Brundage.	Car seats.....	X.
8042	Robbins, John W.....	Saw-mills, setting logs in.	XIV.
8174	Robbins, Jabez, assignor to Joel R. Morse.....	Horn and shells, machines for splitting ..	XXII.
8491	Robbins, L. S.....	Paint-oil from rosin.....	IV.
8490	Robbins, L. S.....	Acid and naptha from rosin, distilling..	IV.
8489	Robbins, L. S.....	Oil from rosin, lubricating.....	IV.
8488	Robbins, L. S.....	Oil from rosin, tanners'.....	IV.
8419	Robbins, Zenas C.....	Telegraph wires, insulators for.....	VIII.
8480	Roberts, Cyrus, and Jno. Cox. Roberts & Lampson. (See J. A. Lawrence.)	Grain, threshing and separating.....	I.
8112	Robertson, John.....	Lead machines, sheet combination of dies for.....	II.
	Robinson, Enoch. (See Jas. R. Bugbee.)		
8594	Rockwell, Francis A.....	Candlesticks	V.
8370	Rockwood, Levi R., assignor to Joseph L. Woodward...	Last-blocks, fastening for.....	XVI.
8534	Rose, Hale R.....	Stoves.....	V.
7877	Ross, James P.....	Planters, seed.....	I.
	Root, Charles H. (See Lamb & Root.)		
8274	Root, James.....	Shutters for shop fronts.....	IX.
8493	Root, James.....	Stoves, folding doors of.....	V.
8052	Rowe, Bradford.....	Leather, machines for stretching.....	XVI.
7976	Ruck, John.....	Piano forte action.....	XVIII.
8211	Rudd, Wm. T.....	Designs in sheet metal, apparatus for punching	II.
8535	Ruggles, H. J.....	Grates, stove.....	V.
7878	Ruggles, Stephen P.....	Printing presses.....	XVIII.
8388	Ruggles, Stephen P.....	Stamps, hand.....	XVIII.
8595	Russell, Charles W.....	Chimney caps	V.
8353	Russell, Ira.....	Bedsteads.....	XVII.
7879	Russell, Jonathan.....	Irregular forms, machines for turning...	XIV.
8109	Rattan, Henry.....	Furnaces, ventilating.....	V.

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No.	Patentees.	Inventions or discoveries.	Class.
	Ruttan, H. (See E. P. Pen- niman.)		
7957	Sabin, H. W., & Geo. Drew..	Hinges, spring.....	II.
8190	Sabin, Harvey W.....	Bedsteads.....	XVII.
351	Sailor, S. H., assignor to Warnick, Leibrandt & Co..	Stoves, cooking.....	Design.
409	Sailor, Saml. H., assignor to North, Harrison & Chase..	Stoves.....	Design.
8454	Salomon, John C. Fr.....	Saddles.....	XVI.
8536	Salomon, John C. Fr.....	Spring saddles.....	XVI.
8558	Salomon, John C. Fr.....	Propelling and steering apparatus for.	VII.
8577	Salomon, John C. Fr.....	Engines, carbonic acid gas.....	VI.
375	Sanderson, Wm. L., assignor to R. R. Finch	Stoves.....	Design.
7904	Sangster, Hugh & James.	Lamps, street, reflectors for.....	V.
8154	Sangster, Hugh & James.....	Lanterns.....	V.
8371	Sargent, Chas. G., and Robt. Thompson.....	Waste-pickers.....	III.
420	Savery, William	Stoves.....	Design.
	Sawyer, W. (See Nesmith & Sawyer.)		
8178	Sawyer, Sylvanus.....	Rattans, machinery for cutting, &c.....	XXII.
185	Scarritt, Russell.....	Sofa bedsteads.....	Reissue.
7908	Scheitlen, Jacob.....	Brick-presses.....	XV.
7929	Schofield, Charles, and Geo. J. Johns.....	Scraper.....	IX.
8079	Schroder, Richard E.....	Kilns, lime.....	XV.
364	Schultz, Frederick.....	Stoves, air-tight.....	Design.
7990	Scott, John, and John Tanna- hill.....	Jacquard machines.....	III.
8411	Scott, William.....	Boilers, revolving	VI.
	Scovill Manufacturing Com- pany. (See Buckingham & Baird.)		
	Swarze, P. Augustus, and Stephan. (See Jacob Ste- phan.)		
8176	Selgrath, Jacob.....	Compounds, lubricating.....	IV.
187	Serrell, Alfred T.....	Mouldings, machinery for making.....	Reissue.
8455	Severson, Benjamin	Wheels, cast-iron car.....	X.
8378	Sexton, Amos J., and Wil- liam Ennis.....	Ships, ventilating.....	VII.
8308	Seymour, E. L.....	Ores, processes of reducing, by zinc compound.....	II.
8212	Seymour, Wm. H.....	Harvesting-machines, rakes to.....	I.
8249	Shaler, Reuben.....	Dyeing door-mats.....	IV.
8430	Sheetz, Edmund.....	Water-wheels, overshot.....	XI.
201	Sherwood, John P., assignor to Calvin Adams.....	Door-locks.....	Reissue.
	Sheperdson, John. (See Hast- ings & Sheperdson.)		
8326	Sherwood, John P.....	Cut-nail machine.....	II.
8562	Sherrod, Walter.....	Mandrels, expanding.....	XIV.
7891	Shields, James, and Samuel Pierce.....	Stoves, coal.....	V.
8259	Short, Sewall.....	Window-sashes.....	IX.
8614	Shull, Thomas E.....	Ten-pins, method of setting up.....	XXII.
7893	Simpson, Andrew L.....	Ox-yokes.....	I.
7892	Simpson, Samuel R.....	Vice, parallel.....	II.
8294	Singer, Isaac M.....	Sewing machines	III.
8550	Skinner, Franklin.....	Shingle machines.....	XIV.
8596	Skinner, Henry.....	Churns.....	I.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8431	Slaight, Thomas.....	Padlock.....	II.
7958	Sloan, Thomas J.....	Screw-blanks, machine for arranging and feeding.....	II.
8027	Sloan, Thomas J.....	Ten-pins, apparatus for setting up.....	XXII.
8082	Sloan, Thomas J.....	Screw-blanks, &c., machine for assorting.....	II.
8155	Sloan, Thomas J.....	Screws, method of finishing the heads of.	II.
8379	Sloan, Thomas J.....	Screws, machinery for threading wood, and feeding apparatus therefor.....	II.
8397	Sloan, Thomas J.....	Screw-blanks and articles of a similar character, machine for arranging.....	II.
8456	Sloan, Thomas J.....	Screws, machinery for shaving, nicking, and reshaving wood.....	II.
8615	Sloan, Thomas J.....	Screws and pins, machines for counting.	II.
	Smart, Luther F. (See Snow & Smart.)		
186	Smith, Edward N., assignor, through others, to American Paper-folding Company.	Paper-folding machines.....	Reissue.
343	Smith, Elihu.....	Stoves.....	Design.
7914	Smith, Elihu.....	Stoves.....	V.
8317	Smith, Horace, assignor to Courtland Palmer.....	Fire-arms, breech-loading.....	XIX.
8066	Smith, Ira H., assignor to Lemuel D. Smith.....	Matches, machinery for making.....	XIV.
	Smith, John. (See Brewer & Smith.)		
8064	Smith, Joseph C.....	Saddles, spring.....	XVI.
7947	Smith, Marion.....	Musical instruments, bellows for.....	XVIII.
8551	Smith, William M.....	Engines, valve for oscillating.....	VI.
8252	Snow, Harvey, and Luther T. Smart.....	Fly-traps.....	XXII.
7963	Snow, Henry H.....	Peppermint droppers.....	IV.
7955	Sours, William.....	Stoves, cooking.....	V.
8343	Southwood, Eli F.....	Sails, method of making.....	VII.
7942	Southworth, Daniel H.....	Planing machines.....	XIV.
8401	Spear, Matthew.....	Mitre boxes.....	XIV.
7998	Speers, N. W.....	Shutters, &c., apparatus for moving and securing.....	II.
8597	Speers, Noah W.....	Blind and shutter operator.....	II.
8120	Spencer, James C.....	Carriages.....	X.
8043	Spoor, A. D.....	Grate bars, agitating.....	V.
	Stafford, D., & Co. (See Ezra Ripley.)		
8337	Stanley, Edwin.....	Bridges, the construction of.....	IX.
8305	Stanley, Hartwell.....	Boot crimps.....	XVI.
	Stark Mills. (See Cyrus Baldwin.)		
8616	Starks, Nathan.....	Bolt-heading machines.....	II.
7911	Starr, Charles.....	Embossing backs of books, tool for.....	XVIII.
8179	Starr, Charles.....	Books, machine for finishing backs of.....	XVIII.
8537	Starr, Vine B.....	Gongs.....	XVII.
8182	Start, William H.....	Harvesters, grain.....	I.
8053	Stearns, Charles W.....	Clogs, or pattens.....	XVI.
8237	Stearns, Charles W.....	Faucets.....	XI.
8213	Stearns, John.....	Hats, machine for pressing.....	XXI.
8228	Stebbins, Erastus.....	Faucets, or gates, molasses.....	XI.
8507	Steger, Joseph, assignor to William Mitchell.	Boots and shoes, machines for cutting soles of.....	XVI.
8474	Stephan, Jacob, assignor to P. Augustus Swarze and Jacob Stephens.....	Cements, for grinding, cylinders.....	IV.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	Stephen, John R., ass'ee. (See Sam'l S. Young, assignor.)		
	Steven, Eb. (See O. N. French.)		
8552	Stevens, Francis A.	Car-brakes, railroad	X.
8004	Stevens, Francis B.	Valves, balanced	VI.
7999	Stevens, Richard F.	Liquids, apparatus for drawing and measuring	XI.
8472	Stevens, Joel, & H. J. Ruggles	Stoves, dairy	V.
8412	Stevens, Joshua, assignor to Massachusetts Arms Co.	Pistols, revolving breech	XIX.
7915	Still, Francis N.	Patterns, mitre, or second, for casting ..	II.
205	Stillman, Paul	Gauges, steam and vacuum	Reissue.
8059	Stillwell, Rickason, & Edwin L. Brundage	Car seats	X.
8568	Stillwell, Lewis E.	Carriage perches	X.
8074	St. John, John R., assignor to James Renwick, George T. Barnard, & E. B. St. John, trustees of St. John's Compass and Log Company.	Hand-logs	VII.
8085	St. John, John R., assignor to James Renwick, George T. Barnard, & E. B. St. John, trustees of the St. John's Compass & Log Company.	Velocimeters, aquatic, method of supporting the vanes of.	VII.
8214	St. John, James	Jacks, lifting	XII.
8413	St. John, L. C.	Dwelling, apparatus for warming air and water for	V.
7922	Storms, William Mt.	Power, motive, method of obtaining	VI.
8070	Storms, William Mt.	Vessels, flexible hose or float for supporting	VII.
8380	Storm, William Mt.	Engines, in which compressed air or other gas heated and expanded by admixture therewith of a heated fluid is used as the motive agent	VI.
8473	Stout, Thomas B., and James F. Morell	Yeas and nays, machines for taking	XXII.
8518	Stover, J. S.	Kilns, grain	VI.
8032	Strait, Hiram	Saw-set	XIV.
8233	Strait, J. V.	Motion, mode of changing reciprocating into rotary	XIII.
7943	Straub, Isaac	Saw-mills	XIV.
8054	Strevell, William, and Daniel Brown	Leather, machines for stretching	XVI.
8569	Strode, Thomas T.	Boring holes in posts, machines for	XIV.
385	Stuart, David, and Jacob Beesley, assignors to Wm. P. Cresson	Stoves	Design.
427	Stuart, David, and Jacob Beesley, assignors to Wm. P. Cresson	Stove registers	Design.
8349	Sturgis, John J., assignor to H. H. Green	Type-casting machines	XVIII.
8084	Sullivan, Jonathan	Straw cutters	I.
7991	Surles, A. J.	Bechives, construction	I.
	Sweetser, Samuel. (See D. Tilton.)		
8328	Sweet, James H.	Spike machinery	II.
8494	Swiney, Edward	Dyeing blue, processes for	IV.
8457	Taft, George C.	Box opener	XXII.
	Tannahill, John. (See Scott & Tannahill.)		

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8519	Taylor, Isaac.....	Glass, frosting plates of.....	XV.
7909	Thatcher, George H.....	Stoves.....	V.
8232	Thatcher, George H.....	Fountain and evaporator, combined....	V.
8263	Thatcher, G. H.....	Stoves with portable ovens.....	V.
8277	Thatcher, G. H.....	Grates, quadrant-hinged.....	V.
7907	Thompson, Ambrose W.....	Propeller.....	VII.
7926	Thompson, Henry G.....	Packing of rotary engines, method of adjusting the.....	VI.
	Thompson, Rob't. (See Sar- gent & Thompson.)		
7997	Thorn, Lewis.....	Tables, extension.....	XVII.
8414	Thornley, O.....	Bedsteads, machines for cutting screws on posts and rails of.....	XVII.
8598	Thorp, Joseph W.....	Garments, apparatus for pressing :.....	XXI.
8318	Tilton, David, assignor to Til- ton & Sweetser.....	Padlock.....	II.
8458	Tilton, Joseph V.....	Stone, machines for dressing.....	XV.
8338	Tilton, Wm. B.....	Violins, &c., construction of.....	XVIII.
7992	Timby, Theodore R.....	Sad-irons, removable handles to.....	XVII.
	Titcomb, C. H., adm'r of E. M. Titcomb, deceased....	Spinning woollen roving.....	Extension.
8538	Todd, George.....	Mill-stones, finishing and balancing....	XIII.
8029	Todd, Wm., ass'r to Charles Atwood and Geo. Kellogg..	Jack-chains, tools for making.....	II.
8584	Tolhurst, G. W.....	Lath machines.....	XIV.
	Towers, William H. (See Goshøe & Towers.)		
8406	Towle, Nathaniel C.....	Tanning.....	XVI.
8599	Tracey, Samuel F.....	Ores, copper, processes for smelting....	II.
8360	Treat, Jas. S., and Stephen Randall.....	Hemp and flax, machine for breaking and reducing the length of fibres....	III.
8276	Treat, Joseph C.....	Furnaces, hot-air.....	V.
7880	Trotter, Jonathan T.....	India rubber, manufacture of.....	IV.
8420	Tucker, Hiram.....	Marble imitating.....	XVIII.
8617	Tucker, Richard S.....	Spinning rope yarns.....	III.
8495	Upham, Joshua.....	Fires, compounds for extinguishing....	V.
8156	Van Anden, William.....	Sugar-drainers, centrifugal.....	IV.
8432	Vance, Elisha.....	Stoves.....	V.
8459	Van Every, Cornelius C....	Seed planter, seeding apparatus of a....	I.
8072	Vanderslice, Thomas.....	Meat-cutting machines.....	XVII.
8108	Vankuran, Isaac.....	Wheels, cast-iron car.....	X.
8173	Vaughn, Maria, administra- trix of Jos. C. Vaughn, de- ceased, ass'r to Jas. C. Bell and R. Christie, jr.....	Wheels, machinery for making iron....	X.
8395	Vaughn, Maria, ass'r to Jas. C. Bell and Robert Chrys- tie, jr.....	Wheel-tires, machines for making.....	II.
404	Vedder, N. S., assignor to A. T. Dunham & Co.....	Stoves.....	Design.
8600	Virtue, Edward.....	Tailors' measures.....	XXI.
373	Wager, James, David Pratt, and Volney Richmond.....	Stoves.....	Design.
8024	Wagner, J. Z. A.....	Brick presses.....	XV.
8012	Walker, Jabez.....	Lock on sheet metal, machine for form- ing.....	II.
8122	Walker, Paris M.....	Hemp brakes.....	III.
8460	Ward, Joshua O.....	Peeling and cutting peaches.....	XVII.
8278	Wardwell, George J.....	Looms' shuttles, motions of.....	III.
7933	Ware, Joseph E.....	Pavements, method of securing ranges of short plank in.....	IX.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8099	Ware, Lawton J.	Cords, coupling for	III.
8570	Warner, Chapman	Foundry apparatus	II.
8433	Warner, Chapman	Lamps for burning vapor of benzole, etc.	V.
8229	Warner, James	Fire-arms, revolving breech	XIX.
7894	Warner, James	Repeating fire-arms, means for revolving the breeches of	XIX.
	Warwick, Leibrandt, & Co. (See S. H. Sailor.)		
	Warren, Chas., & H. G. Sand- ford. (See John Pepper.)		
7964	Waterman, Henry	Cut off, variable, regulated by the gov- ernor	VI.
8115	Waterman, Henry	Saws, &c., machinery for hardening and straightening	XIV.
8083	Watson, William, E. S. Ren- wick, and P. H. Watson...	Harvesters, grain, and binders	I.
7977	Way, Martin and Thomas R.	Tenoning, boring, &c., machines for...	XIV.
8475	Weaver, Richard S.	Printing in colors, machines for	XVIII.
8436	Webb, John G.	Lamps, solar, for burning lard or oil...	V.
8437	Webb, John G.	Gas-burners, Argand	V.
8496	Webster, James	Springs	X.
413	Weeman, Ebenezer	Dates, metallic	Design.
8306	West, George	Pulp screens	III.
7895	Westacott, Robt. G., assignor to Westacott, Lombard, & Lombard	Caviar, manufacture of	IV.
8275	Wetterstedt, C., assignor to Charles Keenan	Paint, metallic alloy	IV.
8601	Wheeler, Thomas B.	Grain sieves	I.
8476	Wheeler, William	Curry-combs, construction of	II.
8618	Wheeler, William	Stone, machines for dressing	XV.
8372	Whipple, Milton D., assignor to Essex Company	Printing house paper, machine for	XVIII.
8001	Whipple, Heman	Brick, machines for preparing clay for making	XV.
8461	Whittaker, Lucius F.	Cradles, swinging	XVII.
8434	White, Jonathan	Furnaces employed in welding shanks to tools	II.
8013	White, Jesse	Wheat fans	I.
8057	Whiteley, Edward	Coffee roasters	XVII.
8400	Whiten, Elijah	Sawing volutes, machine for	XIV.
8188	Whitney, Henry, jr.	Inkstands	XVIII.
8189	Wickersham, J. B.	Fences, iron	IX.
	Wickliffe, Josephine, admin- istratrix of R. Wickliffe, de- ceased, and others, ass'nees. (See C. Masserano.)		
8018	Wieting, Archibald	Planters, seed	I.
	Wigle, James. (See Heffly, Conrad, & Wigle.)		
8295	Wilbar, Francis	Roofs, construction of	IX.
7912	Wilder, A. A.	Lee-way indicator	VII.
7978	Wilder, A. A.	Copying presses	XVIII.
8382	Willard, A.	Churn and butter-worker	I.
7993	Willard, Simon	Buildings, metallic, construction of	IX.
	William, Abijah J.	Heddles, wire, machinery for making ..	Disclaimer.
365	Williams, Seth J., assignor to Williams, Bird & Co.	Stoves	Design.
188	Williams, Thos. R., assignor to J. B. Hyde.	Bats for felting, &c., machinery for forming.	Re-issue.
189	Williams, Thos. R., assignor to J. B. Hyde.	Bats in felting, &c., machinery for hardening.	Re-issue.

VI.—*Alphabetical list*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	Williams, S. G. (See Palmer & Williams.)		
8435	Williston, Gordin.....	Stoves, air-heating.....	V.
7944	Willoughby, J. D.....	Water, apparatus for raising & carrying.	XI.
8462	Wilmot, George R.....	Water-closets, portable.....	XXIII.
8296	Wilson, Allen B.....	Sewing machines.....	III.
192	Wilson, Charles.....	Stone dressing.....	Reissue.
7948	Wilson, Joseph E., and S. Winslow, Isaac. (See Beers & Winslow.)	Hubs and axles, applying friction rollers to.....	X.
7913	Wilson, jr., Daniel, assignor to Daniel Wilson, jr., and Henry M. Bird.....	Nail machine, horse shoe.....	II.
8058	Wingo, T. F.....	Straw-cutters.....	I.
8571	Winans, Ross.....	Locomotive, running-gear of.....	X.
8359	Winters, George.....	Car, railroad, coupling.....	X.
8132	Wolf, David & Herman.....	Planters, seed, seed-distributor of.....	I.
	Wood, Celia R. P. (See Celia R. P. Foster.)		
8048	Wood, John & William W..	Iron, glazed sheet, process of manufacturing.....	II.
8479	Wood, S. W.....	Watering cattle, apparatus for.....	XI.
	Woodcock, Bancroft.....	Plough.....	Extension.
8230	Woodcock, Dennison.....	Staves, machines for sawing and dressing.	XIV.
	Woodward, Joseph, assignor of L. R. Rockwood. (See L. R. Rockwood.)		
8572	Woolman, Enoch.....	Gates, apparatus for opening and closing.	IX.
418	Woolston, Charles J.....	Stoves.....	Design.
7979	Woolston, George F.....	Saws, teeth of.....	XIV.
8393	Woolston, George F.....	Saws for sawing and smoothing boards.	XIV.
8386	Worms, Jacob, assignor to J. Phalen.....	Printing presses.....	XVIII.
	Wright, G. L., and Jas. Ames. (See Ames & Wright.)		
8183	Wright, Joseph.....	Washing tubs.....	IV.
7919	Wyllys, Newell.....	Spinning machines, drawing regulators for.....	III.
8604	Wyllys, Newell, assignor to Charles Collins and Newell Wyllys.....	Leather tubes, machines for making....	XVI.
6071	Yale, Linus, jr.....	Lock and key.....	II.
8438	Yandell, John.....	Telegraphs, insulators for.....	VIII.
8279	Yerby, G. William.....	Ayes and noes, machine for taking....	XII.
8160	Young, Elias.....	Stoves, cooking..	V.
8329	Young, Samuel S., assignor for J. R. Stephens.....	Calculating interest, rule for.....	VIII.
412	Zeuner, Chas., assignor to M. Greenwood & Co.....	Shovels, stand for.....	Design.
8620	Zimmer, Jacob.....	Bedsteads, attaching cutters for cutting screws on rails of.....	XVII.
	Zoiner, Paul W. (See Harris & Zoiner.)		

VII.

INVENTIONS AND CLAIMS

FOR THE YEAR 1851.

No. 7865.—*Improvement in Daguerreotype Pictures.*

What I claim as new, and of my own invention, and desire to secure by letters patent of the United States, is the application of transparent or translucent materials, of varying thicknesses and forms, separately, or in combination with each other, and the application of substances or materials, more or less opaque, either separately or in combination with transparent or translucent materials; both, or either, when such applications and combinations are separately, consecutively, or conjointly employed, for the purpose of manipulating the action of light or chemical substances, substantially in the manner, and with similar effects, to those described and shown.

CHARLES J. ANTHONY.

No. 7866.—*Improvements in Car-couplings.*

Having thus described my invention and improvement, and shown the operation of the same, I wish it to be distinctly understood that I do not claim "*the method of coupling railroad cars, &c., by means of double coupling irons or jaws in combination with a sliding bar*" for disengaging or unlocking said double irons or jaws to relieve the connecting bolt from the draught beam of the leading car, by the deflection of said leading car from the proper line. But what I do claim as my improvement, and desire to secure by letters patent, is in *combination with the curved arms or ends, X', X', of the jaws, X, X, the turning slotted bar, L, attached to the casting, T, (fig. 2,) having its ends, L', L', curved in such a manner as to act as levers, and the spring, B, for keeping the slotted bar, L, and jaws, X, in their proper position; the disconnection of the cars being effected by the contact of the curved arms, or ends, L', of the turning bar, L, with the draught beam, P, when the preceding car runs off the track; when either of the curved arms, X', of the jaws will be relieved from the slot of the turning-bar, L, and permit its curved end, X', to move outward, and open its outer end, and permit the connecting bolt to pass therefrom.*

SILAS M. COCHRAN.

No. 7867.—*Improved Nozzle for Lead Pipe Machines.*

What I claim as my invention, and desire to secure by letters patent, is the corrugated nozzle, with its mandrel, through which melted lead is pumped, for the purpose of making pipe, as herein set forth.

JOHN B. COLLAN.

No. 7868.—*Improvement in Planing-Machines for dressing the edges of Boards.*

What I claim, therefore, as my invention, and desire to secure by letters patent, is the method, substantially as described, of communicating motion from the bottom to the top roller by the two pinions combined with the wheel, having the inner and outer rim of cogs, by means of the joint links, substantially as described, and for the purpose specified.

I also claim operating the machinery for carrying the cutter wheel towards or from the line of motion of the plank by the passage of the plank over and in contact with a spur wheel or wheels, substantially as described; whereby the motion of the cutter wheel for edging tapering planks will be made to correspond with the motion of the plank itself, as described.

I also claim interposing between the wheels, or wheels actuated by the plank and the carriage of the cutter wheel, a reversing motion, substantially as described, by means of which the machine can be made to act on the plank from the narrow towards the wide end, or *vice versa*, or, by suspending its operation, edge the plank with parallel sides, as described.

WILLIAM E. CORNELL.

No. 7869.—*Improvement in Water Metres.*

What I claim as my invention, and desire to secure by letters patent, is connecting the two pistons with the two cranks of a crank-shaft, in manner substantially as described; so that at the end of each stroke of either of the pistons it shall remain at rest, while the crank-shaft is being impelled by the other piston; so that the valves shall be shifted, whilst the piston is at rest, for the purpose, substantially as described.

I also claim, in an instrument for the purpose, herein specified, determining the range of motion of the pistons by means of stops connected with the cylinders and the pistons, substantially as described, in combination with the connexion of the pistons with the crank or cranks by means of a joint, having sufficient play to permit the pistons alternately to remain at rest, while the crank-shaft continues to rotate, substantially as described.

I also claim enclosing all the moving parts of an instrument, substantially such as above described in the surrounding casing, through which the water or other fluid passes to be measured, constructed and operating in the manner, and for the purpose, substantially as described.

J. ERICSSON.

No. 7870.—*Improvement in Churns.*

Having thus fully described the construction and operation of my improved double-dasher churn, what I claim therein as new, and desire to secure by letters patent, is connecting two vertical chains by a horizontal tube at their bottoms, substantially as described, (said tube being about ten inches long, and about one-fifth of the capacity of one of the vertical cylinders,) in combination with the perforated cutters, E, E, operating in the manner and for the purpose herein fully set forth.

DANIEL FISHER.

No. 7871.—*Method of connecting the Slide Valve with the Rock Shaft.*

Having thus fully described the nature and construction of my improvements in oscillating steam engines, what I claim therein as new, and desire to secure by letters patent, is the tubular nut, (13,) serving the two-fold purpose of a guiding rod and of a clamp for the ball joint at the foot of the valve-pitman.

SAMUEL H. GILMAN.

No. 7872.—*Improvement in Machines for assorting Broom Corn.*

What I claim as my invention is the combination of the endless platform, the roller, G, and the series of pressure rollers, or any mechanical equivalents therefor, as arranged and made to operate together, substantially in the manner and for the purpose as herein before described. And, in combination therewith, I claim the rotary shears and the weighted roller, *m'*, or their mechanical equivalents, the whole being applied and made to operate together, essentially as hereinbefore specified.

LORENZO D. GROSVENOR.

No. 7873.—*Improvement in Quilting Frames and Apparatus.*

What I claim as my invention, and desire to secure by letters patent, is the movable frame, working on the connecting piece O, containing two slides, with wickers, for the purpose of stretching the quilt to any desirable length or breadth, as the case may be, in combination with the slides Nos. 1 and 2, working in sections, C, C, by which the quilt may be enlarged or diminished on the rollers Nos. 1 and 2 as set forth.

ABRAHAM KAUFMAN.

No. 7874.—*Improvement in Spring Carriage Wheels.*

What we claim as our invention, and desire to secure by letters patent, is the construction of the spokes, B, B, B, B, B, B, B, B, of flat steel, split, or divided and curved, as at *a, a*, and secured, as at *b, b*, Fig. 1, for the purpose and in the manner herein shown.

JOHN LAMB,
CHARLES H. ROOT.

No. 7875.—*Improvement in Candlesticks.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the com-

bination of the flanch, B, with the circular cap, C, having its orifice, E, eccentric with its periphery, and a guard, G, operating in the manner and for the purpose as above described.

JAMES MANNING.

No. 7876.—*Improvements in Looms for weaving Seamless Bags.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement in one loom of the two series of cams, substantially as described; one series for weaving the cloth double, and the other single, as herein described, in combination with the shifting the treddles from one series of cams to the other, or the equivalent thereof, substantially as herein described.

SHELDEN NORTHROP.

No. 7877.—*Improvement in Seed Planters.*

Having thus fully described my improved seed drill, what I claim as new therein, and desire to secure by letters patent, is—

First. The pinion, K, working between fixed and movable racks, in combination with the elevating yoke (*e*) and the loop (*f*) on its end, for the purpose of raising the teeth from the ground, and simultaneously throwing the feeding apparatus out of gear, substantially as set forth.

Second. I claim the feeding gear, as described, in combination with the lever, (*g*), and its adjustable fulcrum, permitting the pinions to be reversed, by which double the number of changes can be made as can be done by the same number of pinions on the ordinary arrangement.

J. P. ROSS.

No. 7878.—*Improvement in Printing Presses.*

Having thus described my improvements in printing presses, I shall state my claim as follows:

What I claim as my invention, and desire to have secured to me by letters patent, is the gauge bar, for cards, hereinabove referred to, in combination with the vibrating platen and stop finger, and crank, which operates the same, in the manner and for the purpose hereinabove described.

I also claim the use of a segment of a cylinder, in combination with the stationary form bed, so that the rotary inking apparatus may move over the form, and then, after taking ink from the fountain, distribute it on said cylinder as hereinabove set forth.

I also claim the movable bearers on the side of the form bed, arranged and operated substantially as herein above described, so as to be moved outwards when the inking rollers are passing over the form, and drawn inwards when the sheet or tympan is moved up to said form.

I also claim regulating the delivery of the ink by combining with the delivering roller a grooved ratchet wheel and weighted pawl band, operating with the lever stud, cam roller, and stop lever, substantially as hereinabove specified.

I also claim supporting the journals of one of the inking rollers on sliding bearers, so that it may be moved up against the delivering roll by means of studs on said bearers and cams, operating the same as hereinabove set forth.

STEPHEN P. RUGGLES.

No. 7879.—*Improvement in Machines for turning Irregular Forms.*

What I claim as my invention, and desire to secure by letters patent, is the combination and arrangement of the horizontal carriages, G, G, working inside of and moving vertically with the carriage, F, and operating as herein described, for the purpose of making the pattern and rough material pass and repass the tracers and cutting tools, or *vice versa*, when the same are used in combination with a pattern and rough block which do not revolve, and are presented to and operated upon by said tracers and cutters as herein described and represented, and for the purposes fully set forth.

JONATHAN RUSSELL.

No. 7880.—*Improvement in manufacture of India Rubber.*

Having described my improved process for curing rubber, I will state what I claim and desire to secure by letters patent. What I claim, therefore, is the use and employment of zinc, substantially as prepared by the process above described, in combination with India rubber, for the purpose of curing or vulcanizing it, in form and manner as herein set forth, without the use of free sulphur in any way in combination with the rubber.

JONA. T. TROTTER.

No. 7881.—*Improvement in Corn Shellers.*

Having thus described my improvements, I shall state my claims as follows :

What I claim as my invention, and desire to have secured to me by letters patent, is casting the fly wheel of the corn sheller solid with the feeding wheel, so as to bring it between the two bearings of said wheel, as hereinbefore set forth.

JOSHUA M. C. ARMSBY.

No. 7882.—*Improvement in Spring Mattresses for Invalids.*

Having thus fully described my improvements, what I claim, and desire to secure by letters patent, is—

Firstly. The employment of the end stays, (b,) having rule joints allowing a limited range of motion, and standing in a bracing position, substantially in the manner and for the purposes set forth.

Secondly. I claim the centre supports for rendering that part of the mattress permanent when desired.

DAVID BAIRD.

No. 7883.—*Improvements in Rotary Pumps.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the curved water ways in the annular space above the fan or paddle, when substantially as described, in combination with the rotating fan or paddle wheel, substantially as described, and for the purpose specified.

And I also claim the self-adapting valves substantially as described, and governing the apertures leading to the annular space above, in combination with the rotating fan or paddle wheels, and the curved water ways, substantially in the manner and for the purpose specified.

PHINEAS BENNET.

No. 7884.—*Improvement in Looms for weaving Tapestry Carpets with parti-colored warp.*

What I claim as my invention, and desire to secure by letters patent, is regulating the delivery of giving out of one or more warps or chains by the separate tension of each, substantially as specified, in combination with a ground or controlling warp, which determines the length of cloth made at each beat of the lathe, by having the delivery of the said ground or controlling warp regulated by its tension, and controlled by a break, or the equivalent thereof, when the lathe beats up, substantially as specified.

I also claim the employment of an index wheel, or measuring apparatus, or the equivalent thereof, to indicate the length of figuring warps given out or taken up in the process of weaving, substantially as and for the purpose specified, when this is combined with an index or measuring apparatus, to indicate the amount of cloth woven, substantially as and for the purpose specified.

And, lastly, I claim the employment of fingers moving or vibrating independently of the lathe, substantially as and for the purpose specified.

E. B. BIGELOW.

No. 7885.—*Improvement in Fountain Inkstands.*

What I claim as my invention, and desire to have secured to me by letters patent, is the arrangement for cutting off the communication between the cup and the main fountain of ink, by means of a layer of cork or other similar substance in the bottom of said fountain, and a cork or other similar stopper fitted on the bottom of the cup tube, or the lower end of said extended cup-tube, pressing against said layer, as set forth, in combination with above specified arrangement; the inner cylinder in which said stopper moves as a piston, by which the air is more effectually excluded from the main fountain of ink.

FRANCIS DRAPER.

No. 7886.—*Improvement in Machines for jointing Staves.*

Having thus fully described the nature, construction, and operation of my invention, what I claim therein as new and original, and desire to secure by letters patent, is the arrangement, substantially as herein described, of a circular rest, having a sliding motion to and fro in the plane of its axis, and having around its perimeter catches, for the retention of the stave during the process of jointing, and rotating the distance from stave to stave at every forward stroke, and held fast for the action of the rotating jointers upon the stave at every return stroke; the jointers and circular rest being so arranged as to impart at the same time to the stave edges any given bevel and taper, according to the size and bilge of the cask.

WILLIAM MAGUIRE.

No. 7887.—*Improved Fly Tumbler Lock for Fire Arms.*

What I claim as my invention is the fly tumbler, arranged and combined with respect to the sear and the cock, in the manner and for the purposes set forth in my specification.

STANHOPE W. MARSTON.

No. 7888.—*Improvement in Grass Harvesters.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the manner herein described of suspending the cutter ring, *h*, from the wheel, *f*, by means of straps, or other yielding material, for the purpose herein described.

I also claim the combination of the cutters, *i*, *i*, *i*, &c., bevelled cutter ring, *h*, and straps, *g*, *g*, &c., for the purpose of raising the cutter ring over any obstruction coming against the edge of the knife, as herein described.

I also claim the manner of arranging the guide-board, *m*, standard, *n*, arm, *o*, and strap, *r*, secured as described, for the purpose of guiding the machine, and allowing the parts to yield to a sudden stopping of the machine, or to irregularities in the ground, for the purpose and in the manner herein described.

EDWARD NEELY.

No. 7889.—*Improvement in Electro-Magnetic Engines.*

I do not confine myself to the use of any particular battery. What I claim as my improvement, and wish to secure by letters patent, is the insulated disks, in combination with the platina points, to act in concert with the magnetic wheels, in manner and form and for purposes herein described.

JACOB NEFF.

No. 7890.—*Improved arrangement of Arches in Bridge Trusses.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the method herein described of combining and arranging the several arches of a bridge, so as to make each arch, alternately, the upright and inverted arch, as it passes from one span of the bridge to another, and *vice versa*, when one set of said arches have their remotest distance from each other, and their greatest sustaining point directly over and under the points where the other set of arches are changing from upright to inverted arches, or *vice versa*.

C. M. PENNINGTON.

No. 7891.—*Improvement in Coal Stoves.*

We have described such arrangements of flues, &c., as we have essayed with success in the application of the principle of our invention; but we do not wish to limit ourselves to these, as they may be

variously modified. But what we claim as our invention, and desire to secure by letters patent, is the method, substantially as herein described, of supplying currents of atmospheric air to the products of the combustion at or near the throat leading from the fire chamber to the flues, in combination with what is known as Nott's fire chamber, having the draught-throat leading therefrom between the top and the grate, that the upper part of the fire-pot may constitute a feeder or chamber of preparation, substantially in the manner and for the purposes specified.

JAMES SHIELDS,
SAMUEL PIERCE.

No. 7892.—*Improved Parallel Vice.*

What I claim as my invention, and desire to secure by letters patent, is the attaching the lower end of the moving jaw of the vice to a block that is attached to, and moves with, the end of the screw, in the manner and for the purposes herein described.

SAMUEL R. SIMPSON.

No. 7893.—*Improvement in Ox Yokes.*

What I claim as my invention, and desire to have secured to me by letters patent, is arranging in the beam of the yoke two draught staples, some six inches apart, in lieu of one at the centre; and the combination, or use therewith, of a branch chain of proper length, connected to the main draught chain at a proper distance from the beam, and the adjustable hook for modifying the length of the branch chain, as hereinabove specified, and for the purpose set forth.

ANDREW L. SIMPSON.

No. 7894.—*Improved means for revolving the Breeches of Repeating Fire-Arms.*

What I claim as of my own invention, and desire to secure by letters patent of the United States, is the cranked shaft (*e, c, b*) operated by the tumbler having its axis of vibration in the line, or nearly so, with the axis of rotation of the cylinder, substantially in the manner herein set forth.

JAMES WARNER.

No. 7895.—*Improvement in the manufacture of Caviar.*

What I claim, therefore, as my invention, is the improvement in the process of salting the roe or ova, whereby extraneous matters are separated; the same consisting in suffering it to stand in pickle, or a strong saline solution, until it undergoes a process or change by which the ova, and such extraneous matters, separate from one another—the former rising to the surface of the pickle, while the latter falls to the bottom of it.

And I also claim the combination of the male sturgeon oil, as above mentioned, with the salted ova, for the purpose of improving the manufacture thereof as specified

R. G. WESTACOTT.

No. 7896.—*Improvement in Tires for Railroad Car Wheels.*

What I claim, therefore, as my invention, and for which I wish to obtain letters patent, is making the tire of car wheels, by the combination of several distinct pieces, so arranged and disposed as mutually to support and confine each other, substantially in the manner above described.

T. T. ABBOT.

No. 7897.—*Improvement in raising Carriage Tops.*

What I claim as my invention, and wish to secure by letters patent, is the application of a spiral spring to operate upon the braces of a carriage top, so as to assist in supporting and elevating the top, substantially as described and shown.

JOHN L. ALLEN.

No. 7898.—*Improvement in Looms for weaving Piled Fabrics.*

I do not wish to limit myself to the particular mode of connecting the series of bars or plates to admit of the required vibration, as other modes of connecting them may be employed; as, for instance, instead of hanging them back of the lathe by pendulous jointed links, the rods by which they are connected may be adapted to work in slides; but I have described and represented the mode which I have essayed with success and deem the best.

What I claim as my invention, and desire to secure by letters patent, is connecting the intersecting bars or plates with the loom, substantially as described, so that they shall be free to vibrate and yield to the beat of the lathe and shedding of the warps, as described.

And I also claim, combining with the said vibrating bars or plates, a stop or stops, to arrest them at the required point, substantially as described, that the continued beat of the lathe may cause the fabric to move forward over them, as described.

E. B. BIGELOW.

No. 7899.—*Improvement in connecting and disconnecting Hubs and Axles.*

What I claim as my invention, and desire to secure by letters patent, is my device for detaching a wheel from its axle-tree by means of the plate, C, C, acting as a wrench for unscrewing the nut, B, which holds the wheel to the axle; said plate being advanced and withdrawn by the screw, D, substantially in the manner herein described.

A. M. BILLINGS.

No. 7900.—*Improvements in Tuyers.*

What I claim in the foregoing as my invention, and desire to secure by letters patent, is the curved partition in the air chamber, placed opposite the orifice of the windpipe, with its lower edge extending beneath this orifice; the arrangement and construction of the partition being such that it serves the double purpose of directing the blast upwards and facilitating the descent of the cinders, as herein set forth.

JOSEPH DORWART.

No. 7901.—*Improvement in Rotary Pumps.*

I do not claim to be the inventor of the centrifugal pump.

I do not claim simply using collars extending from the openings in the outer case to the openings in the piston case, to prevent the water or air from passing between said cases; nor extending the inlet or suction-pipe inwards in such a manner as to supply the place of one of said collars—this having already been done; but I only claim thus extending said pipe when the collar on the opposite side is made adjustable, and the parts so arranged that the joints of the piston-case with said pipe and collar may be tightened, as they wear by tightening the adjustable collar only, as described; the piston and case, and the suction-pipe being constructed substantially as herein described.

J. STUART GWYNNE.

No. 7902.—*Improvement in changing a reciprocating into a rotary motion.*

What I claim as my invention, and desire to secure by letters patent, is the application to steam or other engines, or machines of a mechanical arrangement, whereby the effect of the applied power is rendered equal, (or nearly so,) both on the outward and return strokes of any reciprocating or vibrating movement, using for that purpose the aforesaid combination of the cranks, connecting rods, and oscillating lever, or their equivalents, as described in the above specification, and shown in the accompanying drawings.

JOSEPH HARRIS, JR.

No. 7903.—*Improvement in Cast Iron Car Wheels.*

What I claim as my invention, and desire to secure by letters patent, is the mode of constructing a cast iron car wheel, by the use of spokes or arms, composed in part of portions of a hollow cone, connected by brackets, and in part by straight spokes or arms, forming a continuation of plates and spokes, possessing the advantages and obviating the objection of both.

GEO. R. McFARLAN.

No. 7904.—*Improvement in Reflectors for Street Lamps.*

What we claim as our invention, and desire to secure by letters patent, is making the faces of the reflector in concave rings, substantially in the manner and for the purposes herein set forth.

HUGH SANGSTER,
JAMES SANGSTER.

No. 7905.—*Improved Steering Apparatus.*

What I claim as new in my invention, and desire to secure by letters patent, is the combination of the cranks, H, H, and the connecting rods, K, K', which are attached by universal joints to the projections or arms, X, X, on the rudder post, the cranks having a worm-wheel, G, on their

shaft or axis, which gears with and is actuated by an endless screw, F, on the axle or shaft of the steering-wheel, the whole of the parts being arranged in the manner substantially as described.

JAS. E. ANDREWS.

No. 7906.—*Improvement in Carriages.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of two bars or reaches, placed in connexion with the straight reach, as above described, and combination with the spring-rod and cross-bar, substantially in the manner described.

JOHN JONES.

No. 7907.—*Improved Propeller.*

What I claim as my invention, and desire to secure by letters patent, is a propeller, constructed as herein described, in such manner that any one of its blades in any line drawn either parallel or perpendicular to its entering edge shall have the curvature of a parabola produced, as herein set forth.

A. W. THOMPSON.

No. 7908.—*Improvement in Brick Presses.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is—

First. I claim, in combination with the clay ducts and alternating carriage of moulds, the rods, *g'*, with their knives, H', (for the purpose of cutting off and forcing into the moulds the regular quantity of clay,) and sliding plate or gate, Z, for the purpose of opening and closing the communication between the clay ducts and moulds, as herein described and represented.

Second. I claim the arrangement of the pins, *n, n*, connecting rods, *o, o*, and standard, N, with its arm, Q, for the purpose of removing the brick after it is raised from the moulds, when the same are operated by means of the cranks, as herein described and shown.

J. SCHEITLIN.

No. 7909.—*Improvement in Stoves.*

Having thus described my improvements in the combined open and air-tight stoves, and shown the advantages of the same, I wish it to be understood that I do not claim the device of sliding doors between parallel jambs or plates for the purpose of concealing the same.

But what I do claim as new, and desire to secure by letters patent, is the providing of the sliding doors, A, with flanges, H, H, on their vertical edges, the real flanges serving the purpose of hinges—in opening and closing the same, and also serving to form air-tight joints when the doors are closed; and the front flanges serving, in connexion with the projecting ends, E, E, of side plates, B, B, to relieve the appearance of a joint when the doors are opened, as before described.

I also claim the providing of the side plates, B, B, with projecting front plates, F, F, for the purpose of forming fronts to the spaces into which the doors are slid when open, to conceal the same; and in connexion with the rear flanges, H, H, to form the hinges of the doors when closing the same; and also to conceal a portion of the front flanges when the doors are opened and slid back, as described.

GEORGE H. THATCHER.

No. 7910.—*Improvement in Convertible Plough Stock.*

What I claim as my invention, and desire to secure by letters patent, is so constructing a subsoil plough, with removable mould board and cutter, in combination with the tri-pronged cultivating teeth, that the same stock may be used either for a subsoil plough or common ploughing and cultivating the land, as herein set forth.

EDWARD T. PARKER.

No. 7911.—*Improvement in Tools for embossing Backs of Books.*

I do not claim forming various devices by gluing or securing loose or detached tools to a surface, as that is common.

But what I do claim as my invention, and desire to secure by letters patent, is forming circular embossing, gilding, or lettering tools of any required pattern for embossing, gilding, and lettering book-covers, by having a case or hollow metal cylinder, B, fitting on a roller, A, and having an opening, *b, b*, or openings, in it of any required form for a panel or other border, the part of the periphery of the roller, A, within the opening or openings in the case, having any required number of small tools, *c, c, c*, of any suitable form or pattern secured to it; the surfaces of the said tools standing even with the outer face of the case or cylinder, B, or by the employment of any number of tools consisting of parts of a hollow cylinder secured to a solid cylinder, substantially in the manner herein described.

CHARLES STARR.

No. 7912.—*Improved Lee-way Indicator.*

What I claim as my invention, and desire to secure by letters patent, is hanging the vane, E, loose at the bottom of the rod, C, which carries or communicates with the pointer, and holding it either in position for operation or secure within the vessel, above the bottom of the keel, by means of a spring, *d*, or its equivalent, operating substantially as herein shown, and for the purposes set forth.

A. A. WILDER.

No. 7913.—*Horse Shoe Nail Machine.*

What, therefore, I claim is the simple combination of the punch, the slotted bed-die, the heading die, the header slide, discharging orifice, and header as arranged, constructed, and made to operate together, substantially as specified; or, in other words, their arrangement and construction essentially as explained, whereby they are made to separate the nail blank

from the rolled plate; to move it downwards upon the header slide; to cause the header slide to advance in the mean time; to hold the nail blank by means of the punch and header slide; to cause the header slide to slide underneath the nail while it is so held; to carry the header against the nail, and head it; to cause the header slide to retrack or move backwards far enough to carry or move the discharging orifice directly under the nail, so that the nail may be forced down into or through such orifice by the further depression of the punch, which next takes place; and, finally, to elevate the said punch to its first or highest position.

DANIEL WILSON, JR.

No. 7914.—*Improvement in Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the combination of a transparent water vessel, with mica-covered or other transparent openings, in the top of a stove plate, and a mirror placed upon a stove top, as herein represented and described.

ELIHU SMITH.

No. 7915.—*Improvements in Metal, or Second Patterns for Castings.*

What I claim as my invention, and desire to secure by letters patent is preparing second patterns, by moulding metal patterns in two-part moulds, and then separating the two parts of the mould, the pattern being left in the sand, to cast a plate fitted to the metal pattern, so moulded as specified; so that the pattern can be attached to the plate, and the two be used in moulding to produce castings, substantially as described.

FRANCIS N. STILL.

No. 7916.—*Improvement in Abdominal Supporters.*

Having described the construction, and also the operation, of my improvement, what I claim as my invention, and desire to secure by letters patent, is the construction of hip springs, with split or divided ends, forming elongations of the same strip of steel, the front prongs having slots and pivot holes, and the back prongs having two or more graduating pivot holes, to be used in combination with the adjusting screw and pivot screws, as herein substantially set forth.

MOSES L. KNAPP.

No. 7917.—*Swivel-nibbed Key.*

I therefore claim as my invention, and desire to secure by letters patent, the making the exposed ends of keys in such a manner that they may revolve freely upon the other parts of the key substantially in the manner and for the purposes described.

JAMES HANLEY.

No. 7918.—*Improvement in the Hydraulic Rams.*

I claim as my invention and improvement the hinge-valve, C, opening upwardly and inwardly, at or near the upper end of the inclined plane

or drive-pipe, C, D, of the hydraulic ram ; said valve being placed in a box made of brass, or any other suitable materials ; which valve, by closing on the reaction of the water in the drive-pipe, prevents the said reaction from distributing the water in the spring or reservoir. The box of said valve is bolted to the drive-pipe, as represented in the annexed drawing ; and said valve may be a hinge-valve, or any other suitable valve.

WILLIAM FIELDS, JR.

No. 7919.—*Improvement in drawing Regulators for Spinning Machines.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the trumpet, as herein described, in connexion with the system of weighted levers, escapements, and reversed cone-pulleys, whereby the force required to move the trumpet is made to vary, under different circumstances, to a sufficient extent to prevent oversensitiveness in the mechanism, which changes the relative speed of the drawing rolls to inequalities in the slivers ; while at the same time but little force is required to effect such changes, thus proportioning the draw more nearly than heretofore to the quantity of fibre in the slivers, and thereby rendering the latter of more uniform diameter and density.

NEWELL WYLLYS.

No. 7920.—*Improvement in Pens for Ruling Paper.*

Whatever may be the number of thicknesses of metal of which the back bar and pens are composed, my improvement, and what I claim, consists in not only making the upper one longer than the others, but in making it the marking part, and soldering the next one below it to it, as specified. Such improved mode of making the pen or pens, I claim as my invention, whether the plates of metal placed upon another be of different metals, or of different thicknesses of metal, as described. And I also claim the improvement on the construction of the back bar ; the same consisting in making it with a slit, or opening, *u*, between any two pens, and extending nearly or quite up to the vertex of the angle or bend of the bar, as specified ; the same producing the advantage above mentioned.

And when the pen is composed of more than two thicknesses of metal, I claim the improvement by which one single soldering of the upper and lower parts together, suffices to bind or keep all the parts together, or in place ; the said improvement consisting in making the lowest thickness of metal longer than any of the others, except the first or upper, and marking one, as described.

And I also claim the method of making the pens and back bar, as shown in figures 5 and 6, when the same are composed of two *different* thicknesses of metal, or of two plates of different metals ; the said improvement consisting in making the lower plate to enclose or lap over the one or other above it, as seen at *g*, in figure 6, and thus make the back bar of one more thickness of metal than the pens are composed of.

And I also claim to make the different thicknesses of the pen of different metals, as specified.

ALFRED HATHAWAY.

No. 7921.—*Improvement in Lard Lamps.*

Having thus described my invention and improvement in lamps, I disclaim the invention of every part of the lamp except the angular chambers, *i*, or grooves, above the reservoir, *a*, on either side of the wick tubes, *b c*, for preventing the spilling or waste of the oil when the stem of the lamp is held in a horizontal or inclined position; and also the dove-tailed slide, *d*, and the aforesaid angular channels or grooves, *i*—I claim as my invention, in combination with a lamp of the peculiar form and construction represented in the annexed drawings, or other form, substantially the same; said channels or grooves serving also to receive and hold the sliding cover, *d*, used for closing the supply opening, instead of the ordinary screw-cap, and in combination with the aforesaid angular channels.

I also claim the said sliding cover, *d*, when made with correspondingly shaped sides to fit and move in said channels, all as herein described and represented.

DELAMAR KINNEAR.

No. 7922.—*Improved method of obtaining Motive Power.*

Having thus fully described the nature of my invention, and pointed out its distinctions from all others, what I claim, and desire to secure by letters patent of the United States, is actuating an engine, such as are now usually driven by steam, or of any convenient form, by means of the combustion allied to an explosion of a measured or detailed quantity of a charcoal (or other solid, carbonaceous fuel, similar in nature, and of like effect) in a measured quantity of highly compressed air, (or oxygen;) said combustion being effected in a vessel which, at that time, is not in connexion, either with the reservoir or main source of compressed air, or with that of the charcoal; and the gases resulting from each separate and distinct explosion being allowed to act on the pistons, or their equivalents, before the other charges are introduced into the exploding or combustion vessel; the whole operation being effected through the agency of apparatus in nature substantially such as are herein specified, or apparatus that shall effect the whole operation in the manner claimed.

I also claim in actuating an engine, as just claimed, using the combustible in a granulated or pulverized form, for the purposes and various reasons made known.

WM. MT. STORM.

No. 7923.—*Improvement in Cooking Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the construction of the adjustable and sliding partitions, (G and G, fig. 3,) by which the draught of the stove and the distribution of the heated air under the bottom of the lower oven is varied and controlled at pleasure, adjusting the same to the particular place and circumstances of each stove; the whole being arranged and constructed substantially as set forth and described.

BACHUS A. BEARDSLEY.

No. 7924.—*Improvement in Machines for Preparing Hides.*

I do not, therefore, wish to limit myself to the precise arrangement and construction herein set forth; but what I claim as my invention, and desire to secure by letters patent, is the method of consolidating and smoothing leather by drawing it with a continuous motion beneath a series of stampers, which alternately rise, fall, and rest upon its surface, a portion of the stampers being at all times in contact with the leather, so that the smoothing of its surface is constantly going on simultaneously with the consolidation by the blows of the falling stampers.

THOMAS W. JONES.

No. 7925.—*Improvement in Fancy Check Power Looms.*

I have thus fully described my improvement in fancy check power looms, and have adverted to many things in this description which I do not mean to claim as new. Some of them are of my own invention, and heretofore used by me—such as the revolving box, shuttle boxes on each end of the lay, to weave thread about the pin wheel, or chain bands of pins by themselves, having long since used them all myself; and, in a word, I disclaim, together with the forenamed, considered singly, everything pertaining to the common power-loom.

But I do claim as my invention the connecting a series of shuttle-boxes by joints at their lower corners, or attaching them to a flat-jointed chain, and connecting their extremities so as to form an endless chain of boxes, and bringing them into a parallelogramic figure by means of two square heads of a size to fit the space between the joints of the boxes, or the chain, and hung on journals, one on the end of the race-beam, and the other on the sword of the lay, substantially as heretofore described.

Second. I claim the combination of the irregular worm, the two sets of double rectangular levers, the connecting bars, and the vertical-notched levers on which the bars operate, the pin band and knees, and the wires connecting the knees and vertical-notched levers, through which the notched levers are moved forward and backward, to embrace the bars, giving them, with the heddles, an upward and downward movement, in any irregular manner desired, substantially as described in the specifications, constituting a new and advantageous *modus operandi* of forming a variegated shed.

ENOCH BURT.

No. 7926.—*Improved method of adjusting the packing of Rotary Engines.*

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as above described, of regulating the packing-ring interposed between the steam-wheel and head of the cylinder, or outer casing of rotary steam-engines, by combining with the said packing-ring a series of segment wedges, operated simultaneously, in manner substantially as described.

HENRY G. THOMPSON.

No. 7927.—*Improved Ship's Light.*

Having thus fully described my invention, I will now proceed to state what I claim as new, and desire to secure by letters patent.

I claim hanging the screwed socket, or frame, C, containing the glass, so as to turn freely within a frame, H, which swings on a hinge, K, K, I, provided with a slot, K, or its equivalent, whereby the socket, C, can be screwed into, or unscrewed from, the fixed socket, B, and, when unscrewed, be swung back, substantially as herein described.

LEONARD GOODRICH.

No. 7928.—*Improvement in Grain Harvesters.*

Having thus described my improved reaping machine, I first claim combining with a reaping machine a self acting weighing apparatus, for weighing the grain into any required quantity, to form sheafs or bundles of a uniform weight, as described, and depositing the same upon the ground in readiness to be tied, whilst the reaping machine is drawn forward and cuts the grain—the said weighing apparatus being made adjustable so to increase or diminish the size of the bundles at pleasure: and this I claim, whether the weighing apparatus be made and arranged as described, or in any other way which is substantially the same, or whether combined with the aforesaid reaping machine, or any other of a similar character.

Second. I likewise claim the combination of the beat-holders, W, W, with the inclined endless conveyor for holding the grain thereupon, whilst conveying it to the weighing and depositing apparatus, as aforesaid.

SIDNEY S. HURLBUT.

No. 7929.—*Improved Scraper.*

Having thus fully described our invention, what we claim as new, and desire to secure by letters patent, is the combination and arrangement of the scoop, A, standard, B, beam, G, arm, E, and handles, H, in such manner that when the scoop is tripped it will revolve sufficiently far to allow the earth to slide off, and then remain in such position that the operator, by a slight movement of the handles, can level down the earth with the scoop, and without the aid of another hand, or another scraper, as herein described and represented.

CHARLES SCHOFIELD,
GEORGE J. JOHNS.

No. 7930.—*Improvement in Seeding Apparatus of a Seed Planter.*

Having thus fully described the manner of constructing and operating our revolving multiplied distributor, and several of the modified forms of the same for distributing seed, and grain, and manures, and other substances, for various purposes, what we claim as our invention, and desire to secure by letters patent, is the employment of the ring, or cylinder, A, having projections on its periphery in combination with the notched and toothed cylindrical gauge caps, C, D, constructed, arranged, and

operated substantially in the manner herein set forth, for increasing and diminishing the size and number of the distributing receptacles as represented in figures 1, 2, 3, 4, 5, and 6.

We likewise claim the combination of the helical spring, I, screw shaft, E, flanged nut, N, and clamp nut, H, with the notched and toothed cylindrical gauge caps, to which the ends of the springs are attached for turning the gauge cap, in order to change the relationship of the teeth or projections of one of the caps with the teeth or projections on the adjacent cap, for enlarging the distributing receptacles, as described in the foregoing specifications, and represented at fig. 5 in the annexed drawings.

We also claim the combination of the screw-shaft, E, clutch-nut, G, clutch washer, F, and clamp-nut, H, with the toothed cylinder cups, C, D, for enlarging or diminishing the distributing receptacles, as described and represented in fig. 6.

We likewise claim the modifications of the distributing apparatus, in their simplified forms, as represented in figures 14 and 15, the several parts being operated in the manner herein set forth.

SAMUEL PENNOCK,
MORTON PENNOCK.

No. 7931.—*Improvement in Sewing Machines.*

What we claim as our invention, and desire to have secured to us by letters patent, is the use of two needles operating alternately—one working vertically, and the other horizontally, substantially as hereinabove described, and uniting two pieces of cloth, or forming the seam, by means of the double loop stitch, as hereinabove set forth.

WILLIAM O. GROVER,
WILLIAM E. BAKER.

No. 7932.—*Improvements in operating the Waste Gate in Hydraulic Rams.*

What I claim as my invention, and desire to secure by letters patent, is, the use of the regulating-slide, M, and nut, or other similar arrangement, in combination with the levers, wires, springs, rods, weights, or other devices, substantially similar to those described for adjusting the "waste" valve, and operated on, and in connexion with a float, F, at the spring, or source, which float rises and falls with the water.

I also claim the use of the hammer, R, resting or falling on a spring-piece, S, for opening the "waste" valve, D, or starting the hydraulic ram, and worked as described, or in any other similar manner.

JOHN OSBORN.

No. 7933.—*Method of securing Ranges of Short Plank in pavements.*

What I claim as my invention, and desire to secure by letters patent, is the method, above described, of securing ranges of short pieces of the planking of a street or road, in longitudinal lines, over water or gas pipes, by means of screws, or keys, with staples, aided by the double bevel of the short planks, and the ends of the permanent, interval planks securely holding and permitting the easy removal of such short piece.

JOSEPH E. WARE.

No. 7934.—*Insulated Fusible Plug for Steam Boilers.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement, herein described, for surrounding a fusible plug and its case by a stratum of air, in such manner that the plug shall promptly melt and give warning, after the water gets low in the boiler, but before the boiler plate, to which the apparatus is applied, is left bare of water, substantially as herein set forth.

I also claim the arrangement of the stopper and plug case, substantially as herein described, for stopping the escape of steam, to admit of the replacement of the fusible plug, without blowing off the steam or water from the boiler after the plug has melted, substantially as herein set forth.

I likewise claim the method of preventing the waste of the metal of the plug, after it has melted, by supporting it in a closed socket, the lower unoccupied part of which is of sufficient capacity to receive and retain the metal when melted, and to allow the steam to pass over it to escape.

E. H. ASHCROFT.

No. 7935.—*Improved Annular Steam Boiler.*

Having thus described the nature of my invention and improvement in the construction of steam boilers, what I claim as new, and of my invention, and desire to secure by letters patent, is—

First. The employment of the tapered rings, B, for closing the ends of any of the water spaces of the concentric boilers, in the manner set forth.

Second. I also claim connecting the lower parts of the annular water spaces, each to each, from the upper and inner to the lower and outer one, substantially as described, by metallic rings or collars, thus giving free ebullition, assisting evaporation, and allowing the dirt to settle down into the blow-pipe, from whence it may be blown out; the aforesaid rings or collars bracing the boiler, as well as forming the connexion between the cylinders.

THOMAS CHAMPIN.

No. 7936.—*Improvements in Hand Looms.*

What I claim as my invention, and desire to secure by letters patent, is the device, consisting, substantially, of the tappet-shaft, with its ring block and ratchet, together with the connecting cord-weight and marches, whereby the heddles are raised and depressed in the proper order to form the shed by the movement of the lay, substantially as herein set forth.

I likewise claim the device, consisting, substantially, of the levers, with the breast-beam cords and picker-stick cords, whereby the picker-sticks are moved to drive the shuttle by the movement of the lay.

ISAAC H. GARRETSON.

No. 7937.—*Improvement in Machines for turning Irregular Forms.*

What I claim as my invention, and desire to secure by letters patent, are—

First. The three cutter cylinders, A, B, C, with cutters arranged as within described, in combination with the sliding frame, compound

cams, and cam-rails, constructed and arranged substantially in the manner and for the purpose herein described.

Second. I claim the combination of the compound cams and cam-rails with the sliding frame and devices, within described, for holding and revolving the timber material, whereby such vertical motion is produced in the latter, while being subjected to the action of revolving or vibrating cutters, as to reduce the timber to the required form.

PHILO S. BEERS.

No. 7938.—*Improvement in Tools for tonguing, jointing, and rebating*

What I claim as my invention, and desire to secure by letters patent is so making a jointing, tonguing, and rebating plane, that the jointing and tonguing of a board, while resting on its edge, and also the jointing and rebating of it, while it lies on its flat side, may all be performed with one planing tool, in the manner substantially as herein described, and for the purposes herein set forth.

I also claim making the tonguing hand plane in such a manner as to enable the workman to make, therewith, tongues of various thicknesses, substantially in the manner herein set forth, whereby I prevent the necessity of providing different tools to tongue planks of different thicknesses.

I also claim, in combination with a divided body, or plane-stock, the two cutters, having each a cross-cutting and a side-cutting edge, and the means, substantially as herein described, for adjusting the distance apart of the two cutters and bodies, whereby the plane is made capable of dressing the sides of a tongue to any desired thickness, and, at the same time, to cut the shoulders as herein specified.

I also claim, in combination with the gauge, G, the use of the body, 'B', and the cross edge of the cutter, P', to constitute a jointer to straighten the edge of a board, preparatory to tonguing it, and while resting on its edge in a situation to receive the tonguing.

I also claim the gauge, G, in combination with the notch, p, and the side edge of the cutter, P, acting as herein described, as a jointing plane to straighten the edge of a board or plank, resting on its flat side, in a position to have a rebate cut in the manner substantially as herein set forth.

JOHN A. FRY.

No. 7939.—*Improvement in Weavers' Heddles.*

Having now described the nature of my invention, and in what manner the same is carried into effect, I declare that I do not claim metal in combination with harness or heddles, when used in the solid state, and fixed to the harness or heddle yarn at each end, such heddle yarn not being continuous, as in my invention.

But what I do claim as my invention, is covering, coating, or lining the loop eyes in heddles or harness with metal by the process I have shown, or by any equivalent process.

CHARLES TIOT JUDKINS.

No. 7940.—*Improved attachment for opening and closing Doors or Shutters.*

What I claim as my invention, and desire to secure by letters patent, is the use of swinging attachments, or jibs, F, G, for moving sliding-doors or shutters, constructed and operating substantially in the manner herein shown and described.

WM. POST.

No. 7941.—*Improved Snatch Block.*

What I claim as my invention, and desire to secure by letters patent, is the closing up of the opening in the side of a ship's snatch block, by means of a gate, (E,) arranged and operating substantially as herein set forth, by which I am enabled to make the block shorter and more compact than it has heretofore been made.

I also claim the securing the pulley axle, *f*, in its place, without the aid of screw and nut, or rivet heads, and in such a manner that it can be readily removed by means of the combination of the said pulley-axle with the enclosing strap, C, and the gate strap, D, substantially in the manner herein set forth.

PHILIP RHODES, JR.

No. 7942.—*Improvement in Planing Machines.*

I claim—First. The use of circularly grooved rollers in front of the cutter to divide and cut the unplaned surface of the board into narrow longitudinal strips, whereby the outer shavings are taken off in narrow strings or threads, in the manner and for the purposes herein set forth.

Second. I do not claim simply the arrangement of the plane stocks, with their cutters, upon the travelling frame in such order that one gang or set of cutters will plane one plank by their movement in one direction, and another gang of cutters plane another plank by their movement in the opposite direction, and remove the first plank planed from the bed; but this I claim only when these are used in connexion with the circular groove scoring roller, as within described.

D. H. SOUTHWORTH.

No. 7943.—*Improvement in Saw-Mills.*

What I claim as my invention, and desire to secure by letters patent, is the method of imparting a rocking or curved motion to the saw, and of straining the same by mechanical devices, substantially such as herein described.

ISAAC STRAUB.

No. 7944.—*Improvement in Apparatus for raising and carrying Water.*

What I claim as my invention, and desire to secure by letters patent, is the double draught cord so arranged and connected with the car windlass, that it effects the two-fold purpose, of propelling the carriage to and fro, and of turning the car-windlass to unwind and wind up the bucket cord, thus insuring the descent of the bucket into the well.

J. D. WILLOUGHBY.

No. 7945.—*Improvements in Knitting Machines.*

Having thus described the construction and operation of my improved machine, I claim as my invention the following new improvements:

My first improvement consists in the manner of producing the upward and downward motion, as above described, of the lead sinkers and the jack sinkers, so far as they move simultaneously; and

I claim the half jack, U, vibrating on the comb-bar, P, and connected with the sinker frame and with the movable cross bar, 28, and springs, 29, for the purpose of depressing the tail-ends of the jacks, and thereby raising their forward ends with the jacks' sinkers, as aforesaid.

I also claim the movable cross bar, 28, containing the springs, 29, connected as aforesaid, and for the purposes aforesaid.

My second improvement consists in the manner of producing the backward and forward motion of the jack and lead sinkers, as above described; and

I claim the cams, 7, in combination with the cross-bar, 60, with the projections thereon; the hanging bars, S, vibrating on pivots; the comb bar, P, and the half jacks, U, connected with the sinker frame, as aforesaid, and for the purposes aforesaid.

My third improvement consists in the manner of moving the carrier-needle and slur-knob, as aforesaid; and

I claim the combination of the cam, V, and the shoe and shoe-plate, for the purposes aforesaid.

I also claim the combination of the cam, V, with the shoe, 5; the movable shoe plate, *f*; the chains, *h* and *l*; the semi-circles and hubs, or wheel and hub; the bar, W, connected with the slur carriage and the slur-knob, Q, and the horizontal bar, X; the carriage, *q*, connected with the carrier-needle, *q*², for the purposes aforesaid.

My fourth improvement consists in the manner of moving the ribbed work attachment, and producing the ribbed stitch, simultaneously with the plain stitch, without the machine slide, and with one presser, as above described; and

I claim the combination of the cams, 9, with the levers, 18, connected with the frame, 17, and with the ribbed needle bar, 16, for the purposes aforesaid; also, the same in combination with the presser, *r*, connected, moved, and operating as aforesaid, and for the purposes aforesaid.

JOHN PEPPER.

No. 7946.—*Improvement in Cooking Ranges.*

What I claim as my invention, is the improvements by which the hot-water back is connected with the plate, G, and by means of which said hot water back may be either readily removed at any time, or applied in such manner that the directions of its water pipes may be disposed so as to accommodate the bath boiler, into which they are usually led, on whatever side of the range the said bath-boiler may be placed; the said improvements consisting, *first*, in the connecting piece, H, and the attachment of it and the hot water back, the whole being made to operate together, substantially in the manner as above set forth; *second*, in a second set of attachments (fixed in the opposite face of the water back) in combination with the first set thereof, as described.

I also claim the peculiar arrangement of flues, which lead the smoke and volatile products of combustion directly around the oven; the said arrangement of flues causing the heat to course against one half of the bottom of the oven; next into another flue, which takes it *backwards* and against the other half of the bottom of the oven; thence up a flue against the back of the oven, through a flue extending over and against half of the top of the oven; thence into and through another flue, which carries it backwards and over and against the top of the oven and conveys it to the chimney or discharge flue—not meaning to include in such arrangement the radiating chamber or space, Y, Z, hereinbefore mentioned.

And I also claim the two recesses, *l*, *m*, and two flue-plates, *p*, *q*, applied to the plate, K, in combination with the two valve openings, X, A', their damper and cam-plate, as applied to the top plate of the oven-frame and used under an arrangement of oven flues, substantially as described; the same allowing of the adaptation of the oven to either side of the fire-place, or the use of two such ovens and their frames, in connexion with the fire-place, all essentially as hereinbefore stated.

I also claim the improvement by which the oven can be raised and readily removed, and by which the smoke is prevented from passing underneath the partition which separates the flues on top of the oven, the same consisting in the sliding or gravitating plate, G', affixed to the partition, and made to operate substantially in the manner as specified.

MOSES POND.

No. 7947.—*Improvement in the Bellows for Musical Instruments.*

What I claim as my invention, and desire to secure by letters patent, is the method, herein described, of making or constructing the *wind chest* commonly used in seraphim melodeons, and all similar musical instruments, with one or more sides, made of *gum elastic*, or other elastic material, and in such way and manner as to be capable of expanding and contracting, or of being increased or diminished in size; and, with the aid of metallic or other springs, to answer all the purposes of the common bellows generally used in those and similar instruments, substantially as described.

MARVIN SMITH.

No. 7948.—*Improvement in applying Friction Rollers to Hubs and Axles.*

We do not wish to confine ourselves to the use of spiral springs to the exclusion of springs of other forms, nor to two springs, as one can be made to produce the same result.

What we claim as our improvement, and desire to secure by letters patent in the herein-described method of applying friction rollers to the axles of wheel-carriages, is the interposition between the bearing of the axle and the faces of the friction rollers of a loose sleeve, through which the axle is free to slide endwise; while it at the same time carries the sleeve round with it in its rotation, the sleeve having a groove in its outer periphery to receive the friction rollers and prevent them from moving endwise on the collar.

JOSEPH B. WILSON,
STACEY WILSON.

No. 7949.—*Improvements in Planing Machines.*

What we claim, and desire letters patent for, is—

First. The combination of the shifting bed plate with the planes, Z, fig. 1, constructed in the manner herein described, the planes presenting any desired part of their edge for cutting the surface of the board after tonguing and grooving has been performed by the circular saws.

We also claim the rotating arm, h, fig. 1, with their cover, fig. 4, combined with the planes, Z, fig. 1, substantially in the manner and for the purposes herein set forth.

JOHN D. BEERS,
ISAAC WISNLOW.

No. 7950.—*Improvement in Electro-Magnetic Engines.*

Having now described my invention, I will proceed to state what I claim as new, and desire to secure by letters patent:

I claim the use and manner of arranging the helices and poles of the electro magnets, in combination with the revolving bars, or sets of bars—that is to say, the helices being upon the bends of the magnets from which the poles of the magnets extend towards and near to the centre of motion, and the revolving bars or armatures extending outwards from the centre of motion, and embracing the poles of the magnets successively as it rotates for producing a magnetic multiplying power engine, substantially in parts and principle as herein set forth.

THOMAS C. AVERY.

No. 7951.—*Improved connexion for the Beams and Columns of Iron Buildings.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the method, herein described, of securing together the beams and columns of cast-iron fronts for houses by means of the lugs, with their flanges on the upper and under sides of the ends of the beam, and the projections on the inside at the top and base of the columns, as herein fully shown and represented.

JOSEPH BANKS.

No. 7952.—*Improvements in Sad Irons.*

What I claim as my invention is the above-described improvement in the construction of the bottom of the polishing iron, the same consisting in making it with ridges or projections and concavities, substantially as herein before explained.

EDWARD CLAPP.

No. 7953.—*Improved double-acting Spring Hinge.*

Having thus described my improvements in the spring hinge for the entrance-doors of hotels, &c., I wish it to be understood that I do not claim the “combination of an adjustable curved inclined plane with a portion

of a hinge, and an adjustable bearing roller with the other portion of the hinge."

But what I do claim as new, and desire to secure by letters patent, is the manner of combining the helical springs, L and M, with the cylindrical rotating tumbler, J, and cylindrical sectional case, so that, by the rotation of the cylindrical tumbler, J, the heart-shaped projection, K, will be made to traverse over the inclined plane, I, and cause the tumbler, J, to rise and fall, and thus compress and expand the helical springs lengthways their coils, and simultaneously therewith wind and unwind said helical springs around the spindle, F, and thus cause them to act (by the motion of the door in either direction) by torsion and expansion to close the door when it shall have been opened, as described and represented.

THEODORE F. ENGELBRECHT.

No. 7954.—*Improvement in Extension Tables.*

Having thus fully described the construction and operation of my improvement in extension tables, what I claim therein as new, and of my invention, and desire to secure by letters patent, is the arrangement of a screw, or other equivalent device, in combination with the slides, in such a manner that a screw, or its equivalent, of sufficient length to move out *one* pair of slides, will move out *any number* desired, substantially in the manner and for the purpose set forth.

FRANCIS HOGUET.

No. 7955.—*Improvement in Cooking Stoves.*

Having thus fully described my improvements, what I claim as new therein, and desire to secure by letters patent, is the transverse partition, (c,) in combination with the arrangement of front and back flues, as above described, for causing the several currents to unite after having traversed courses of nearly equal length, as set forth.

WILLIAM SOURS.

No. 7956.—*Improvements in Machinery for turning Irregular Forms.*

I do not claim merely the employment of two or more cutter wheels, or cutter shafts, or cylinders, provided with any number of cutters of any required form for cutting the whole surface of, and forming articles of any irregular form, without the use of the model of the article to be formed. But I claim this only when the cutting cylinders are sustained, revolved, and carried to and from the block, to be turned by a revolving cylinder, in whose periphery they are placed, without any longitudinal motion, while the block revolves slowly, without any longitudinal or lateral motion, substantially as described.

ABNER LANE.

No. 7957.—*Improvement in Spring Hinges.*

Having thus described our improvements, what we claim as new therein, and desire to secure by letters patent, is the piece (*f*) to one side of which the spring is attached, and which has on the other side a

projection, with a hole therein, by means of which and a pin the springs can be engaged and disengaged when the door is shut, substantially in the manner and for the purposes described.

HARVEY W. SABIN.
GEORGE DREW.

No. 7958.—*Machine for arranging and feeding Screw Blanks.*

I do not wish to be understood as limiting myself to the precise construction and arrangement of parts herein specified, as these may be variously modified within the principle of my invention; but I have described that particular mode of construction, which I have essayed with success.

What I claim as my invention, and desire to secure by letters patent, are the lifters, which select and lift the blanks, &c., from the hopper, substantially as specified, in combination with ways or conductors, or the equivalents thereof, substantially as specified, into or on to, which the blanks, &c., are transferred, as specified.

And I also claim giving to the lifters, or to the inclined ways, or their equivalents, a lateral motion, in combination with a stop, or detector, substantially as specified, for the purpose of arresting the operation of the lifters until a further supply is required, as specified.

THOMAS J. SLOAN.

No. 7959.—*Improvement in Paper Moulds.*

Having now described the nature of our said invention, and in what manner the same is to be performed, we wish it to be understood that we do not claim as of our own invention, nor do we claim the exclusive use of the apparatus and machinery herein described, and referred to for stamping and filing, except when employed in, and for the production of, our improved plates or moulds. We hereby declare that we claim as our invention the improved moulds for the manufacture of paper, as made in the manner herein specified—that is to say, by stamping or forming such moulds partly, or wholly, in and by dies, and afterwards removing the back of such moulds by filing, or other process analogous thereto.

WILLIAM BREWER,
JOHN SMITH.

No. 7960.—*Improvements in Power Governor.*

Having thus explained my improvement, what I claim as my invention, and desire to secure by letters patent, is communicating the action of governors to the valves, or other parts of machinery, governed thereby in such manner as to cause, by accelerating or retarding the motion of said valves, large amounts of regulating power to be added to or taken from the engine by a given change of the speed when the motion of the engine becomes too much retarded, whether such retardation arises from increase of work or resistance, or from diminution of the tension of the moving force; and also small amounts of regulating power to be added to or taken from the engine by a like change of speed, when the

motion is too much accelerated, whether such acceleration arises from diminution of work, or resistance, or from increase in the tension of the moving force, as herein set forth.

Second. I also claim connecting the valve arm, or parts to be regulated, to the regulator by a cam or its equivalent, having progressive rates of action, when the same is employed for transmitting the action of governors to the parts of machinery to be governed, and for the purpose of causing the motions of valves, gates, weirs, or other analogous parts to take place rapidly for the regulation of low speeds, and slowly for the regulation of high speeds, substantially in the manner and for the purposes set forth.

Third. I also claim making the eccentric curve of the vibrating cam to vary its position with respect to its centre of vibration, for the purpose of varying the rapidity and extent of opening of the valve according to the pressure of steam, in the manner herein set forth.

JUNIUS JUDSON.

No. 7961.—*Improvement in Calculating Machines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The logarithmic curves of the outer scale in combination with the diagonals and graduated arms to the curves, being laid out substantially in the manner herein set forth.

Second. I claim the trigonometric curves of the inner scale in combination with the graduated arms and logarithmic curves of the outer scale, the curves being laid out substantially in the manner herein described.

Third. I claim the two graduated arms constructed in such manner that they can be moved in connexion, or independently, substantially in the manner and for the purposes herein set forth.

J. W. NYSTROM.

No. 7962.—*Improved method of bracing the water spaces of Boilers.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the method, herein described, of bracing and securing the shells of boilers or fire-boxes of locomotive and other engines, by means of ribbons of sleeves, or stationary sleeves, so that, when a bolt or bolts are to be removed to cure leaks, or to renew the sheets in the fire-box, the sleeves will remain in place, serving as a guide to punch the new sheets by, and affording greater support to the shells, both in backing out the old and riveting the new bolts, as herein fully described and shown.

BERNARD O'NEILL.

No. 7963.—*Improvement in Peppermint Droppers.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The construction of a "peppermint dropper," by combining a sugar kettle (fig. 2, A) with a revolving cutter, (fig. 3;) and,

Second. The combination of such dropper either with a railway, (fig. 1,) the dropping sheet being stationary, or with a movable dropping sheet, the dropper itself being stationary, or with a railway and a movable dropping sheet combined, all substantially as herein described.

HENRY H. SNOW.

No. 7964.—*Variable Cut-off, regulated by the Governor.*

What I claim as my invention, and desire to secure by letters patent, is regulating a variable cut-off valve by a motion derived from and corresponding to that of the governor, by means of a toe or vibrating lever attached to the rock shaft, acted upon by revolving pins or cams, when either the cams are made to vary in position with respect to the toe, or the toe in length with respect to the cams; the whole machinery being constructed and acting substantially as herein described.

HENRY WATERMAN.

No. 7965.—*Method of adjusting the stroke of Trip Hammers.*

Having thus described my invention, some of its advantages I claim to be as follow:

First. Simplicity and cheapness of its construction; and,

Second. Its peculiar adaptability to water power, while at the same time it seems to combine nearly all the capacities and facility of regulation of the steam hammer.

What I claim as my invention, and desire to secure by letters patent, is the construction of a trip hammer, in which the hammer is raised by cams, not acting directly upon the hammer or the helve, or a projection from the same, commonly called the lifting leg, but by the intervention of a movable joint, so constructed as to grasp or clutch the lifting leg at any required height, the position of the same being governed by the regulator, which may be constructed in the form of an inclined plane or any equivalent contrivance for raising and depressing the joint at the will of the operator; the whole being constructed to perform the peculiar services substantially in the manner herein before set forth in this my specification.

LUTHER BRIGGS, JR.

No. 7966.—*Improvement in Machines for Climbing Poles.*

What I claim as my invention, and for which I desire to secure letters patent, is the combination of the grappling levers with the sandals and handles, for the purpose of climbing telegraph poles, masts, &c., and holding the climber at any desired height, so as to give him free use of his hands when at rest, as herein described and represented.

HENRY D. CHAPMAN.

No. 7967.—*Improvement in Cast Iron Car Wheels.*

I do not make any claim to the combination self-considered of wrought iron tire with a cast iron body, or yet for full plate sides, or for internal rams in section when cast solid with the side plates, of a railroad car

wheel, for such have all been known and used before; but what I do claim as new, and desire to secure in letters patent, is the precise manner in which I have constructed and put together the parts of my wheel, by which, thus formed, they are free of strain from shrinkage in cooling, and have semi-internal flanges, as described, to protect the wheel when in use against lateral strain, and are bolted together and combined with a wrought iron tire, in the manner set forth.

P. G. GARDINER.

No. 7968.—*Improvement in Machinery for making Tires by continuous rolling.*

Having described the operations of the machine sufficiently, as I here proceeded with the description of the construction of the same, I proceed to point out the new parts contained therein.

What I claim as new, and desire to secure in letters patent, is stopping the advancing movement of the movable towards the stationary roller when the tire shall have attained its proper section, by means of self-acting mechanism, acting and constructed substantially as herein described.

I also claim the combination of belts, pulleys, clutches, screws, and screw wheels, with the sway bar and triggers, by which a self-acting, advancing, and retrograding motion is given to the movable roller, each motion changing to the other, when caused so to do, by the hand of the operator, but self-arrested and stopped by the set of the triggers, substantially as specified.

P. G. GARDINER.

No. 7969.—*Improvement in connecting Trucks with Car Bodies.*

What I claim as my invention, and desire to secure by letters patent, is connecting the bodies of cars to the trucks by two bolts to each truck, working in the holes or mortices above described and represented, the whole being constructed and operating substantially as herein set forth.

THOMAS P. HOW.

No. 7970.—*Improved use of Slides in Bee-Hives.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the manner, herein described, of arranging the moth apartment with glass, paper, or other thin material, overlaying the vent holes in the top of the box, said glass or paper having placed upon it old comb or other suitable material, so as to be warmed by the bees in the boxes below, and ventilated as described, thus attracting the moths into said apartment while they are at night entirely excluded from the bee boxes by means of ventilating buttons, as described.

I also claim the arrangement by which the upper box or boxes are held in their places while the one below is removed and another inserted in its place.

Also, the arrangement at the rear and bottom of each box by which the tin slide is removed, thus allowing a convenient opportunity for clearing the bottom of the bee boxes as described.

NATHANIEL POTTER.

No. 7971.—*Improved Window Curtain Fastening.*

I claim the construction of rack-pulleys for window-shades, by fixing the pulley, over which the cord of the shade-roller runs, upon a stem, having a plate sliding on the front outer face of the rack box, attached to a thin plate or fin passing through a slot in said face, extending the length of the box, the said fin projecting upwards, and terminating in a point, which acts as a pall against ratchet teeth made in the bottom of said box, or else the said fin projecting downwards and having a cross pin through it, acting against ratchet teeth in the upper and inner side of said box; the said stem and plate, in addition to the sliding motion along the box, having an oscillating motion on the upper or lower edge of the plate, by means of which the upward pressure of the cord on the pulley holds the pall or pin against the ratchet teeth or the downward pressure of the hand, carries the pall or pin out of the line of the teeth and permits the pulley to be moved upwards when required, substantially as set forth in this specification.

HUGH GUYER.

No. 7972.—*Improvements in Steam Drilling Machines.*

What I claim as my invention, and desire to have secured to me by letters patent, is the combination of a direct action steam drill, in which both engine and drill are mounted on a frame, which slides in a swinging frame, capable of being adjusted in any required position with the apparatus, substantially as herein above described, which is connected with, and actuated by, the cross head of the engine for causing the sliding frame to move along the swinging frame towards the rock.

JOSEPH W. FOWLE.

No. 7973.—*Improvement in Air-tight Franklin Stoves.*

What I claim as my invention, and desire to secure by letters patent, is making the fire box with closed plate in front and behind, with a grate surface at bottom, occupying about one-third of the space between the front and back stove-plates, to constitute hot air chambers front and back, when such fire-box is combined with a sliding damper at bottom, substantially as and for the purpose specified.

And I also claim, in combination with a fire chamber constructed as above specified, and governed at bottom with a sliding damper, as specified, the open front, with vertically sliding doors as described, and for the purpose specified.

RENSSELAER D. GRANGER.

No. 7974.—*Improvements in securing Daguerreotypes in Monumental Stones.*

What I claim as my invention, and desire to secure by letters patent, is the mode, herein described, of securing the portrait plate against injury (from moisture or otherwise) by means of the two glass plates, D and F, the plaster, I, and back plate, H, the whole being arranged and combined substantially as herein set forth.

SOLON JENKINS, JR.

No. 7975.—*Improvement in Cooking Stoves.*

Having thus fully and clearly described the nature, construction, and operation of our joint invention, what we claim therein as new, and desire to secure by letters patent, is the combination of the driving flue, (*d*,) as described, with the driving flues, (*a*) and (*f*,) as described, the said flues occupying the whole breadth of the stove, with the exception of the space occupied by the fire-doors and the central reverting flue in the back.

We also claim the gravitating damper, (*l*,) operated as described ; that is to say, by the rod, (*n*,) with its curved eye, (*m*,) and the pendant lever (*i*,) with its bend, (*p*,) and catch, (*O*,) the said damper being located upon the division plate between the back diving flues and the central back reverting flue.

JAMES GREER,
RUFUS J. KING.

No. 7976.—*Improvement in Piano-Forte Action.*

What I claim as new in my invention, and desire to secure by letters patent, is :

First. Hanging the hammer-shank on a hinge or joint, (*d*,) at a distance from its end, and effecting its communication with the fly-lever or jack by means of a lever, *L*, which is hung on a fulcrum, (*i*,) at a distance from either end, and is connected at one end by a hinged or jointed link with the end of the hammer-shank, in such a manner that when the fly-lever is raised by the key, the end of the hammer shank is drawn down, and the hammer thrown up to the string; or by any other means substantially the same.

Second. The universal repeating spring, *m*, attached to the lever or butt upon which is formed the projection, *K*, or its equivalent, through which the fly-lever communicates with the hammer, for the purpose of raising it, and working upon the end of the fly-lever, in the manner substantially as and for the purpose herein set forth. This I claim, without reference to the precise form of the projection, or of the spring herein shown, as various modifications may be made for producing the same effect.

Third. Attaching the check-wire to a hanging or hinged butt, *Q*, operated upon by the key, in the manner substantially as described, so as to produce the same effect as if attached to the key, for the purpose of allowing the key to be easily taken out.

Fourth. Securing or placing the regulating screw, *r*, for controlling or regulating the escapement of the fly-lever, in an arm, *N*, or its equivalent, upon the lever upon which the fly-lever acts, by which the action of the said screw upon the fly lever is more gradual and easy, and the jarring or concussion produced when the screw is stationary is avoided.

JOHN RUCK.

No. 7977.—*Improvement in Machines for Turning, Boring, &c.*

What we claim in the foregoing as our invention, and desire to secure by letters patent, is the tool and block holder herein described, consisting

of two upright frames, capable of movement towards each other, and of being clamped at a greater or less distance apart, as may be required to adapt them to holding blocks of different sizes, and tools of different lengths or forms, each frame being provided with upright parallel guides, carrying adjustable jaws for holding, boring, or turning tools, at different heights and angles, and to aid in holding blocks of irregular forms; these frames being mounted upon a carriage capable of being turned or moved right or left, so as to hold the tool or present the substance to be bored in the required position, substantially as herein set forth.

MARTIN WAY,
THOMAS R. WAY.

No. 7978.—*Improvement in Copying Presses.*

What I claim as my invention, and desire to secure by letters patent, is the use of a lever handle, I, having its fulcrum on the pressing-plate, B, attached to the opposite plate, F', by links, H, H, as shown, working in the manner described, in *combination* with the adjusting arrangements, C, E, G, g, for the purposes expressed, and operating together, as shown, or in any substantially similar manner.

A. A. WILDER.

No. 7979.—*Improvement in the Teeth of Saws.*

I claim as my invention the insertion of teeth in circular saw blades, of the form and for the purpose above set forth.

GEORGE F. WOOLSTON.

No. 7980.—*Improvement in Dressing Mill Stones.*

What I claim as my invention, and desire to secure by letters patent, is the new and improved mode of dressing mill-stones, which I have described above as fully and correctly as I can.

E. P. GAINES.

No. 7981.—*Improvement in Trunk Handles.*

What I claim as my invention, and desire to secure by letters patent, is casting the article in two parts, in such a form that they may be put together without any alteration of the parts, and so that they cannot get out of place, when the handle is attached to a trunk or other article, when the whole is constructed substantially as herein described.

ELIJAH A. ANDREWS.

No. 7982.—*Improvement in delivering Parti-colored Warps in Weaving.*

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as herein specified, of producing figures that will match on tapestry carpets, or other fabrics woven with printed warps, by the employment of a clamp or clamps, to be clamped on to the warps, as specified, in combination with belts, or their equivalent, having a positive delivery motion, and to which the said clamp or clamps can be attached at given distances, as specified.

E. B. BIGELOW.

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Having thus fully and clearly described the nature, construction, and operation of our joint invention, what we claim therein as new, and desire to secure by letters patent, is the combination of the driving flue, (*d*,) as described, with the driving flues, (*a*) and (*f*,) as described, the said flues occupying the whole breadth of the stove, with the exception of the space occupied by the fire-doors and the central reverting flue in the back.

We also claim the gravitating damper, (*l*,) operated as described; that is to say, by the rod, (*n*,) with its curved eye, (*m*,) and the pendant lever (*i*,) with its bend, (*p*,) and catch, (*O*,) the said damper being located upon the division plate between the back diving flues and the central back reverting flue.

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RUFUS J. KING.

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What I claim as new in my invention, and desire to secure by letters patent, is:

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Second. The universal repeating spring, *m*, attached to the lever or butt upon which is formed the projection, *K*, or its equivalent, through which the fly-lever communicates with the hammer, for the purpose of raising it, and working upon the end of the fly-lever, in the manner substantially as and for the purpose herein set forth. This I claim, without reference to the precise form of the projection, or of the spring herein shown, as various modifications may be made for producing the same effect.

Third. Attaching the check-wire to a hanging or hinged butt, *Q*, operated upon by the key, in the manner substantially as described, so as to produce the same effect as if attached to the key, for the purpose of allowing the key to be easily taken out.

Fourth. Securing or placing the regulating-screw, *r*, for controlling or regulating the escapement of the fly-lever, in an arm, *N*, or its equivalent, upon the lever upon which the fly-lever acts, by which the action of the said screw upon the fly lever is more gradual and easy, and the jarring or concussion produced when the screw is stationary is avoided.

JOHN RUCK.

No. 7977.—*Improvement in Machines for Turning, Boring, &c.*

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of two upright frames, capable of movement towards each other, and of being clamped at a greater or less distance apart, as may be required to adapt them to holding blocks of different sizes, and tools of different lengths or forms, each frame being provided with upright parallel guides, carrying adjustable jaws for holding, boring, or turning tools, at different heights and angles, and to aid in holding blocks of irregular forms; these frames being mounted upon a carriage capable of being turned or moved right or left, so as to hold the tool or present the substance to be bored in the required position, substantially as herein set forth.

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THOMAS R. WAY.

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A. A. WILDER.

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I claim as my invention the insertion of teeth in circular saw blades, of the form and for the purpose above set forth.

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What I claim as my invention, and desire to secure by letters patent, is the new and improved mode of dressing mill-stones, which I have described above as fully and correctly as I can.

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What I claim as my invention, and desire to secure by letters patent, is casting the article in two parts, in such a form that they may be put together without any alteration of the parts, and so that they cannot get out of place, when the handle is attached to a trunk or other article, when the whole is constructed substantially as herein described.

ELIJAH A. ANDREWS.

No. 7982.—*Improvement in delivering Parti-colored Warps in Weaving.*

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as herein specified, of producing figures that will match on tapestry carpets, or other fabrics woven with printed warps, by the employment of a clamp or clamps, to be clamped on to the warps, as specified, in combination with belts, or their equivalent, having a positive delivery motion, and to which the said clamp or clamps can be attached at given distances, as specified.

E. B. BIGELOW.

No. 7983.—*Improvement in Jacquard Looms for weaving Cut Pile Fabrics.*

I do not wish to be understood as limiting myself to the precise construction and arrangement of parts herein specified, as these may be greatly varied within the principle of my invention.

What I claim as my invention, and desire to secure by letters patent, is combining with the power-loom for weaving cut pile fabrics double, substantially as described, a jacquard machine for producing the figures on such fabrics as described.

I also claim, in the weaving of cut pile fabrics double, with the figures produced by the jacquard, dividing the figuring warps so that one half (or nearly so) of the figuring warps shall be in connexion with each of the cloths or fabrics, substantially in the manner and for the purpose specified.

I also claim, for the weaving of cut pile fabrics double, as described, the double and reversed arrangement of the jacquards, substantially as described.

I also claim, in the weaving of fabrics of the kind herein described, passing the double fabric between two vibrating bars, having curved faces, to determine the length of pile between the two cloths, in combination with the two rollers or their equivalents, over and under which the fabrics pass after they have been separated, substantially as described; and this I also claim in combination with a vibrating knife or knives for cutting the pile to separate the two fabrics as described.

E. B. BIGELOW.

No. 7984.—*Improvement in fastening of Scythes to the Snath.*

What I claim as new in my invention, and desire to secure by letters patent, is setting the edge of the blade up or down, or more or less obliquely, by means of the adjusting screw, (*f*), in combination with the edge of the aperture, *a*, which form the bearings of the two sides of the shank of the blade, substantially in the manner herein set forth.

E. S. CLAPP.

No. 7985.—*Improvement in Scythe Fastening.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Making the shank, *C*, of curved or arch form longitudinally, as described, which enables it to be fitted to the snath so as it may be set in or out by giving it a slight motion in a curved direction.

Second. The mode of securing the shank, *C*, so as to admit of the edge of the blade being set up or down, by making the cavity in the projection, *a*, through which the shank passes, widest at the back, and making the back edge of the shank and the inner side of the tightening key, *E*, of corresponding arch form transversely, so that the shank may be held secure in any position.

OLIVER CLARK.

No. 7986.—*Improvements in the method of Casting the Backs upon the Teeth of Curry Combs.*

Having thus described the manner of procedure according to my invention, such as I have essayed with success, I wish it to be understood

that I do not limit myself to the precise mode herein described, but that I cover all modes which are essentially the same, effecting the same end by means substantially the same.

What I claim as my invention, and desire to secure by letters patent, is the employment of a bar in combination with the cope of a two-part flask for casting the back on to the plates of curry-combs, the said bar being notched to receive and hold the said plates during the process, all substantially as described.

JAMES M. GARDNER.

No. 7987.—*Adjustable Cut off.*

Having thus particularly described the nature of my improvement, what I claim therein as my invention, and for which I desire letters patent, is:

First. The tappet (*t*) vibrated by the impact of projections upon the slide valve rod, and lifting thereby a poppet valve which admits steam to the slide valve chamber during periods varying with the height to which the tappet is placed by the elevation or depression of the sliding rod or other object to which it is pivoted, said rod being raised or depressed by a motion derived from the governor, or communicated to it in such other manner as may be deemed expedient.

Secondly. I claim the mechanism, substantially as described, for prolongation of the admission of steam beyond the period at which it would be cut off by the tappet, to wit: the sliding plate (*w*) and the intervening bar (*o*), the former with a pair of receding inclined planes or edges, and the latter with an equal and parallel pair of salient planes, which, by sliding upon the former, hold up the poppet valve after the tappet has ceased to act for a period, likewise depending upon the movement of the rod, which latter may be actuated as set forth in the former claim.

SAMUEL H. GILMAN.

No. 7988.—*Improvement in Cylinders for Figuring Looms.*

What we claim as new, and desire to secure in letters patent, is the mode of connecting the movable cams, *d*, and the slide pieces, *I*, with the drum, *H*, substantially as set forth, and for the purpose herein stated.

E. M. HASTINGS,
JOHN SHEPHERDSON.

No. 7989.—*Improvement in Scythe Fastenings.*

I do not wish to limit myself to the specific construction of the parts as described and represented, as this may be varied without changing the principle of my invention; as for instance any other mode of securing the plate, which forms the bed of the scythe shank, when set in any given position, may be substituted for that herein described. As I have simply described and represented the mode of construction which I have essayed with success, what I claim as my invention, and desire to secure by letters patent, is the method, substantially as herein specified, of securing or fastening the scythe to the snath by means of the clamp jaws acting on the beveled or curved edges of the wedged formed shank,

in combination with the method of holding down the end of the shanks by mean of the till thereon, which works on to the toothed plate of the recess as described, whereby the scythe is held more firmly to the snath, to resist all strain, than by any other method heretofore practised.

And I also claim the method, substantially as described, of spotting the scythe, that is, regulating the line that it shall have relatively to the curves of the snath, by means of the movable or adjusting plate, *c*, the edge of which forms the bed for the shank of the scythe when drawn down by the clamps as described.

EBEN'R. G. LAMSON.

No. 7990.—*Improvements in Jacquard Machines.*

What we claim as new in our invention, and desire to secure by letters patent, is—

Firstly. The manner of operating the cylinder by means of the double lockers, O, O, in combination with the springs, P, P, whereby its complete operation is effected by the upward motion of the trap board, C, substantially as and for the purpose herein described.

Secondly. The application of the weights, *l, l, l, l*, to the tail cords above the harness, for the purpose of more effectually keeping them tight, or straight, and thereby insuring the more correct operation of the trap boards and needles upon them, substantially in the manner herein set forth.

JOHN SCOTT,
JOHN TANNAHELL.

No. 7991.—*Improvement in the Construction of Bee Hives.*

What I claim as my invention, and desire to secure by letters patent, is having the comb placed within the trap, I, fortified or protected from the moth, or other insects, by the diaphragm, M, substantially in the manner herein fully explained.

A. J. SURLES.

No. 7992.—*Improvement in Removable Handles to Sad Irons.*

What I claim as my invention, and desire to secure by letters patent, is the method, herein described, of constructing sad, tailors', and other hand-smoothing irons with handles, which can be readily and securely attached to the iron, and easily detached therefrom, substantially as herein specified.

T. R. TIMBY.

No. 7993.—*Improvement in the Construction of Metallic Buildings.*

Having thus described the nature of my improvements in the construction of metallic buildings, what I claim as new, and of my own invention, and desire to secure by letters patent, is carrying up the vertical *u*-shaped flange-binders between the flanges of the roof-plates, to which they are attached, thus supporting the roof, and binding it firmly to the building.

I also claim such binders attached in such a manner in connexion with the tie plates, or rods, Q, attached at the same spot between the flanges, and by the same bolts; and this I claim, whether the suspension bars, R, be employed or not.

SIMON WILLARD.

No. 7994.—*Improvement in Adjustable Land Sides of Ploughs.*

Having thus described our improvements in the plough, we wish it to be understood that we do not claim the employment of an adjustive plate for elevating the rear portion of the plough to regulate the depth of the furrow.

But what we do claim as our invention, and desire to secure by letters patent, is providing a right angled heel-plate, L, with a hook, P, for the purpose of interlocking with a hooked-shaped projection, Q, attached to the land-bar, forming a hook joint, said heel-plate, L, forming the bottom and side of the land-bar, and having its rearward portion susceptible of vertical adjustment by means of a screw, T; and, when adjusted, being clamped by a horizontal screw bolt, N, its shank being placed in a segmental slot, to admit of its moving with the heel-plate, as described.

GEORGE HEFFLEY,
SAMUEL CONRAD,
JAMES WIGLE.

No. 7995.—*Apparatus for securing Shutters in any required position.*

What I claim is the right to the rods, pintles, sockets, screws, and apertures, connected, arranged, and acting substantially in the manner and for the purposes described.

CHARLES W. KREBS.

No. 7996.—*Improved Sash Lock.*

What I claim consists in the spring, F, to throw the turning hook outwards, the spring catch, G, (applied to the frame of the hook,) and the projection, H, (extending either from the curved rail or the lower window sash,) in combination together and with the said clamp-hook and rail, the whole being made to operate substantially in the manner as herein before specified.

MICHAEL NORTON.

No. 7997.—*Improvement in Extension Tables.*

Having thus fully described the construction and operation of my improved extension table, what I claim as new, and of my invention, and desire to secure by letters patent, is—

First. The slides, E and F, in combination with the cross bars, G, and folding rails, I; and, second, the recess for the reception of the loose leaves, being formed substantially in the manner and for the purpose set forth.

LEWIS THORN.

No. 7998.—*Apparatus for moving and securing Shutters, &c.*

What I claim as my invention, and desire to secure by letters patent, is the manner of opening and closing window shutters from the inside, and securing them firmly at any point in their semi-circuit by means of the horizontal screw shaft, B, inserted in an opening in the lower portion of the window frame, metallic nut, E, surrounding the same, and the bar or plate, F, attached to the shutter, substantially as described.

A. W. SPEERS.

No. 7999.—*Improved Apparatus for drawing and measuring Liquids.*

What I claim as my invention, and desire to secure by letters patent, is the combination of measures with faucets, cocks, or gates used in drawing liquids from cans, casks, barrels, &c., in such a manner that by opening the faucet attached to the cask, the measure will be filled; then, by closing the same, the desired amount may be drawn by opening the corresponding faucet in the measure, the whole combined substantially as described, and for the purpose set forth.

RICHARD F. STEVENS.

No. 8000.—*Improvement in Scythe Fastenings.*

What I claim as my improvement, is the combination of the two wedge shaped bearers, H, I, the confining bolt, F, and the support at the extreme, or other end of the shank, as constructed, substantially in the manner as specified, the whole being for the purpose of enabling a person to change the position of the blade of the scythe in a direction transversely of the plane of the blade.

NATHANIEL LAMSON.

No. 8001.—*Improvement in Machines for preparing Clay for Making Brick.*

What I claim as my invention, and desire to secure by letters patent, is the use of a revolving screen, constructed of bars, *a, a, a, a*, set at a slight inclination from the horizontal position, having lugs or crushers, *e, c, c, c, c*, within it; each lug being hung or suspended at one end, on a bar, *o*, and prevented from touching or rubbing the screen by cord or chain, *i*, attached to its other extremity, and rod, *p*, supporting or constructed, and operating in any manner substantially the same and for the purpose set forth.

HEMAN WHIPPLE.

No. 8002.—*Improvement in Upright Piano Fortes.*

What I claim is the arrangement of the sounding board in upright pianos, between the strings and the performer, substantially in the manner described.

HENRY KLEPFER.

No. 8003.—*Improvement in Scythe Fastenings.*

I claim the arrangement of the hole or holes, *f, f, f*, at the head of the confining clasps in such manner, with respect to the axis, *g*, of the screw, *H*, that when the said screw is turned one hundred and eighty degrees, the position or positions of the same (*i. e.* the hole or holes) may be changed in such manner as to secure one or more new and different positions for the shank, the same being for the purpose as specified.

NATHANIEL LAMSON.

No. 8004.—*Improvement in Balanced Valves.*

I do not claim as my invention valves having seats of such relative diameters that they shall be retained thereon by the pressure of steam; but what I claim as my invention, and desire to secure by letters patent, is in the above description of valve, where the disk is held by a support running up through the hollow valve, so forming the valve that the upper seat shall be larger in diameter than the lower one, by means of the ring, *r*, attached to the valve, and by means of the ring, *s*, attached to the seat, or by any means substantially the same, for the purpose of retaining the valve on its seat, by the pressure of steam, whenever its position or location in respect to the steam passages is such that the pressure of steam is below the valve when closed.

FRANCIS B. STEVENS.

No. 8005.—*Improvement in Machines for Folding and Measuring Cloth.*

Having thus fully described my invention, I will proceed to state what I claim as new, and desire to secure by letters patent:

I claim—first. Folding the cloth as it passes through or between the calender rollers during the process of calendering, or by passing it through or between a pair of revolving rollers, *E, E'*, similar to calender rollers, the said calender or other rollers being hung in a carriage, *F, F, G*, which receives a reciprocating motion above or across a table, *C*, and a tilting motion at each end of its stroke, so as to bring each roller alternately to bear on the table as it (the carriage) moves in different directions across it, thereby laying the cloth under the rollers on the table in folds or layers, in the manner substantially as herein described.

I claim—second. Making the reciprocating motion of the calender rollers of a certain fixed length; such length determining the length of the fold, and thereby measuring the cloth, substantially in the manner herein described. At the same time I wish it to be understood that I do not claim the measurement of cloth by folding it in layers or folds of a certain length, unless such layers or folds are laid by calender or other similar rollers.

HENRY BOOT.

No. 8006.—*Improved Horse Shoe Nail Machine.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is making a horse-shoe nail

by means of a stationary, former, and a series of travelling and rotating cams, arranged and operating substantially as herein described and fully shown.

MARSHALL BURNETT.

No. 8007.—*Improved Machine for sticking Pins on paper.*

In the machine which I have now fully and exactly described—for sticking pins crosswise of narrow fillets of paper, to prepare it, when so stuck, for winding, and winding the same into coils—there are several parts which are common, or such as have been used by others, which I do not claim separately nor in other combinations.

I do not claim the upper feeding channel, or inclined conductors, when made of straight bars; nor cylinders with parallel sides, which have been used for conducting wood-screws and similar headed articles; nor the downward curved conductors; nor any other feeding channels, unless they are combined with the conical form of rollers or the separator.

I do not claim the crimps, nor any peculiarity in inserting the pins through them, if made crosswise of the sheet, and the pins inserted lengthwise of it, and not crosswise of both the crimps and fillet, or ridges raised in it.

I do not claim nor use any kind of crimping “bars,” “jaws,” or “clamps,” as they have been heretofore used.

And, generally, I wish it to be distinctly understood, that I do not limit myself to the precise form or arrangement of parts, nor the particular devices for moving them; for these may be much varied without changing the principle of my invention as set forth; nor do I limit myself to the single process of inserting only one pin at once, or only one edge of the fillet: for on the same principles, with only circumstantial variations of the machinery, I can insert several pins at once on the same edge of the fillet, or on both edges of it; and other similar variations can be made by any competent machinist without any essential or substantial variation from the character of my invention, as herein described and set forth.

First. I do claim the conical form of rollers to constitute my feeding channel for arranging the pins and moving them forward in the channel, with the most suitably decreasing rates of descending velocity, as herein described.

Second. I do claim also as my improvement and invention, and desire to secure by letters patent, the combination of the parts and the adaptation of my machine for feeding the pins, separating and delivering them, crimping the fillet, and sticking the pins crosswise of such fillet, and finally rolling the fillet into a coil, substantially in the manner described.

I claim also the screw separator, as described, placed in the feeding channel to restrain the natural descent of the column of pins, so that they may be delivered as fast, and no faster than they are required for sticking, substantially as herein described and set forth.

C. O. CROSBY.

No. 8008.—*Improvement in Wheat Fans.*

Having thus fully described my invention, what I claim herein as new, and desire to secure by letters patent, is two or more chambers and areas, in combination with a fan, for the purpose of cleaning and separating grain, by using one and the same blast (to clean it) over and over again any number of times, as herein fully described and represented.

JOHN HOLLINGSWORTH.

No. 8009.—*Improvement in Mills for grinding Paints and Drugs.*

I do not intend to confine myself to the precise forms of construction herein described, as those may be varied in many ways to produce the same results; as, for instance, the rotation of the mullers may be effected by the use of gearing, or the spindles of the mullers may be firmly fixed and the bed-stone be made to revolve—all of which methods involve the principles of my invention.

What I claim as of my own invention, and desire to secure by letters patent of the United States, is the construction of a mill in which the grinding surfaces shall consist of a plane or planes operating upon a cone, as herein described.

I claim also the lever (*k*) in combination with the muller, for the purpose of regulating the feed; the whole being constructed substantially in the manner as set forth herein.

G. D. JONES.

No. 8010.—*Improvement in Rice Hullers.*

Having described my invention, I will now state what I claim as new, and desire to secure by letters patent.

I claim operating the pestle by having it attached to a rod passing through the bottom of the mortar, and receiving motion through a crank, or its equivalent, placed below it, substantially as and for the purpose herein set forth.

PETER McKINLAY.

No. 8011.—*Improvements in Blasting Rocks, &c.*

Of course I do not mean to suggest the use of cartridge as anything new in blasting; and I am aware that clay has been used around a charge in wet holes, by way of puddling, to fill the little fissures and stop the leaks; and also as to the use of water, where a *depth* of it can be had sufficient to make its *weight* available, I am aware that this would not be new. But as to my device of packing around the cartridge for the object before indicated, and with water—irrespective of the consideration of its weight—I do not know whether this device is new or not; and that I may be upon the safe side, I shall not claim it. Moreover, it is not important for me to claim it, inasmuch as it is a device which can in no other way be so conveniently available as in connexion with the use of said *binder*, which I do claim.

And now, to sum up in brief what I claim as my invention, and desire to secure by letters patent, it may be sufficient to state—

First. I claim the use of an artificial binder, by means of which to restrain the action of the blast in opposite directions, by off-setting said action against itself, substantially as herein before explained.

Second. I claim the use of the little packing wedge, or wedges, within the charge or blast chamber, substantially as described.

CHARLES MONSON.

No. 8012.—*Improved Machine for forming a Lock on Sheet Metal.*

Having thus fully described my invention, I will now proceed to state what I claim therein as new, and desire to secure by letters patent. I claim the employment of a cam or cams, *g, g*, on the tumbler, *D*, operating on levers, *E, E*, connected with the under side of the movable jaw, *C*, in combination with a spring or springs, *l*, substantially in the manner described, for the purpose of closing the lip, *e*, and securing the plate while folding, and raising the lip and releasing the plate after the folding is completed.

JABEZ WALKER.

No. 8013.—*Improvement in Wheat Fans.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the fan, air-trunk, and head, constructed and operating substantially in the manner and for the purpose herein described.

JESSE WHITE.

No. 8014.—*Improvement in Bran-Dusters.*

Having thus fully described our improvements, we wish it understood that we do not claim the beater and fan revolving within an upright stationary beater and bolt, as these have before been used; but what we do claim, and desire to secure by letters patent, is the combination of the openings, (*d* and *l*,) both provided with valves or registers, with the runner and fan revolving within an upright cylindrical casing, the upper part of which acts as a beater, and the lower part as a bolting apparatus, substantially as described, for the purpose of separating the flour which adheres to the bran after undergoing the ordinary bolting; the said process being regulated and adjusted to suit the circumstances of weather, &c. by admitting more or less air, either above or below, by means of the registers, as set forth.

JNO. M. CARR,
JAS. HUGHES.

No. 8015.—*Improvement in connecting and disconnecting Wheels and Axles.*

I do not claim the cap, the nut, or the axle; but what I *do* claim as my invention, and desire to secure by letters patent, is the dog and the spring combined, and operating as above set forth.

SIMEON HEYWOOD.

No. 8016.—*Improvement in the Manufacture of India-rubber.*

Having described my invention, and the best mode known to me of manufacturing the same, what I claim as my invention, and desire to secure by letters patent, is the combination of potash with rubber and sulphur, and submitting the same to a high degree of heat, whereby to produce the change upon rubber known as vulcanizing.

DAVID McCURDY.

No. 8017.—*Improvements in Splint Machines.*

What I claim, and desire to secure by letters patent, is the combination of the cylinders, F and G, with their cutters, J, J, attached, (for the purpose of giving a rounded form to the splints,) and the cylinder, K, with its spurs, *l*, (for the purpose of dividing the splints in one direction,) with the circular cutter or saw, N, (for the purpose of separating the splints from the timber,) and the guide, *v*, to guide the splints in the channel, *u*; the whole being arranged substantially in the manner and for the purposes above set forth.

HENRY MELLISH.

No. 8018.—*Improvement in Seed Planters.*

Having thus described the nature of my invention and improvement, and the operation of the same, what I claim as new, and of my own invention, is placing two or more hollows, drill teeth, in a direct line, one behind the other, managed and drawn by the same drag-bar; the front tooth being made the longest, and so placed as to run somewhat deeper in the soil than its successor or follower, for the purpose of depositing fine manure, or chemical agents, beneath the grain when planted in rows or otherwise, as herein fully set forth and represented.

ARCHIBALD WIE'TING.

No. 8019.—*Improvement in Machines for cutting Screws on Bedstead Rails.*

Having thus fully described our improvements in cutting screws, what we claim as new therein, and which we desire to secure by letters patent, is the peculiar form and manner of securing the V-cutter to the cylindrical head, as described; that is to say, making the cutter as represented, and letting the tapered end of the shank into the recess, bringing the angular shoulder against the cylinder, and sustaining the bevelled points against the interior bevelled surface of the cylinder head, by which arrangement the instrument, during the operation of cutting, is forced firmly against the head, the strain upon the confining screw being thereby greatly reduced, and the cutting tool itself strengthened.

H. GROSS,
W. CAMPBELL.

No. 8020.—*Stone and Metal Conglomerate for Paving, &c.*

Having thus described the nature of my invention, what I claim therein as new, and for which I desire letters patent, is forming a block suitable

for paving, masonry work, or analogous purposes, of a conglomerate of iron and stone, by running the molten metal among broken stone within a mould, either with or without the devices, substantially as herein described, for jointing and locking together the contiguous blocks.

GEORGE H. KNIGHT.

No. 8021.—*Improvement in Brick Presses.*

Having thus fully described the nature of my invention, what I claim herein as new, and desire to secure by letters patent, is the lip, *e*, hugging closely the rim of a wheel containing moulds; the said lip being a prolongation of a gradually narrowing feed-trough, formed and operated after the manner and for the purposes substantially as herein described—namely, the formation (by pressure of untempered clay) of a uniform and coherent brick.

JOHN J. RIDDLE.

No. 8022.—*Improvement in Sawing Machines.*

Having thus pointed out the nature of my invention, and the manner in which I have essayed the same with success, I will state that I do not wish to limit myself to the precise mode of constructing and arranging the parts, as these may be variously modified without departing from the principle of my invention.

But what I claim as my invention, and desire to secure by letters patent, is making the circular saw with both faces convex, in the manner and for the purpose substantially as specified, when this is combined with the guide, substantially as specified, for spreading apart the plank to prevent the binding of the saw, as specified.

PEARSON CROSBY.

No. 8023.—*Improvement in fastening down Table Leaves.*

What I claim as my invention, and desire to secure by letters patent, is the combination of devices, by means of which table-tops of different forms and dimensions can be readily secured to and disconnected from the same frame, as herein set forth.

LEWIS J. MASON.

No. 8024.—*Improvement in Brick Presses.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the mould wheel with the grooved and smooth pressure roller, substantially as herein described; the grooved roller gauging and partially compressing the clay into the moulds, and forming a projecting band of clay, which is subsequently compressed into the moulds by the smooth-pressure roller.

I also claim the grooves in the mould wheel, in combination with the flanges of a hopper, which is supported on the frame of the machine, independently of the mould wheel, by which arrangement the clay is prevented from escaping laterally, and working in between the teeth of the driving wheels; hence the latter can be placed near to the moulds,

and the machine thus made more compact, while, at the same time, the danger of breakage is diminished.

I likewise claim detaching the bricks from the pistons of the mould wheel by means of the tappets and lever, as herein set forth.

J. Z. A. WAGNER.

No. 8025.—*Improvement in Apparatus for Bolting Flour.*

Having thus clearly and exactly described the nature and operation of our joint invention, we wish it distinctly understood that we do not claim the broad principle of bolting meal by an air blast, as this has been imperfectly done before; but what we do claim as new, and desire to secure by letters patent, is the application of a blast cylinder with spiral issues, as described, to the process of bolting flour or other pulverized materials; by means of which, during a continuous blast, the meal is consecutively thrown against the bolting cloth, and so much as is not passed through at once is given an interval of time to fall from the cloth, and leave open the meshes, and is thus, as it were, refed to the impulse of the blast from each succeeding issue; the intermittent action at the same time causing eddies that loosen, and, as it were, rip up the bran and flour from the cloth, separate the bran from the flour, and twirl the particles of bran in such a manner as to leave the flour free to pass through; while the bran, from the twirl thus given it, is caused to present its broadest surface to the bolting cloth, the specking of the flour being thereby prevented and avoided; the several parts being arranged substantially in the manner and for the purpose described.

We also claim the insertion of a set of beaters at a suitable distance down the bolting cloth and blast cylinder, which, during the bolting process, shall interrupt the same at a time when the bran requires beating, in order to loosen the flour from it preparatory to the further continuance of the bolting process, substantially in the manner and for the purpose described.

We also claim the chambers (Y) and (I,) by means of which the light flour, carried up by the escape of the blast, is regathered, and returned to the usual gathering chamber (S,) substantially in the manner and for the purpose described.

LEWIS FAGIN.

HENRY C. HAYMAN.

No. 8026.—*Improved Saw Set.*

Having thus described the construction and operation of my improved saw-set, what I claim therein as new, and desire to secure by letters patent, are the following particulars:

First. Supporting the lever, by which motion is given to the jaws, by means of an adjustable stirrup, constructed substantially as described; whereby said stirrup serves as a gauge, in addition to performing its ordinary duties.

Second. I claim the arrangement of the jaws, constructed of one bent piece of metal, with the lever and stirrup; the handle of said lever projecting backwards, towards the rounded part of the jaws; the whole being constructed substantially as herein described.

ELIJAH S. HOLKINS.

No. 8027.—*Apparatus for setting up Tenpins.*

What I claim as my invention, and desire to secure by letters patent, is elevating the pins of a bowling alley by means of a set of elevating sockets, operated from the head of the table when this is combined with any well-known device or devices, which will permit the pins to fall, and sustain them in a vertical position, after they are elevated, substantially as described.

THOMAS J. SLOAN.

No. 8028.—*Improvement in Horse Powers.*

What I claim as my invention, and desire to secure by letters patent, is the manner of arranging and connecting the whipple-tree and brake, so that when the horse is drawing, the brake is off the wheel or pulley; and when not, is on, and acting as a governor, as hereinbefore described, for the purposes herein before set forth.

AARON D. CRANE.

No. 8029.—*Tool for making Jack Chains.*

Having now fully described my invention, I disclaim all right to the grooved pin. But I claim the combination of the stud pins, *i* and *i'*, with the bending stud and holding dog, arranged and acting substantially as described.

WILLIAM TODD.

No. 8030.—*Improvement in Ladies' Work Tables.*

Having thus fully described my improvement, what I claim as new, and desire to secure by letters patent, is the mounting of the upper leaf, B, and disk, G, with the drawers, R, R, Q, on the rotary standard, X, thus raising or lowering the whole, to suit different persons, by the screw, L.

Second. I claim the rotary disk, with drawers hung thereon by the screw, U, supported by the pin, K, which can turn round the standard, independent of the leaf or standard, B, X, and raised or lowered, as herein set forth.

CELIA R. P. WOOD,
(Now CELIA R. P. FOSTER.)

No. 8031.—*Improvement in Grain Separators and Fans.*

What I claim as my invention, and desire to secure by letters patent, is constructing the elevator with double troughs, *c*, *e*, in the manner herein described, for the purpose of preventing the grain from falling through between the cells.

I moreover claim the combination of the herein-described elevator, J, wind-channel, L, and plate-valve, *m*, with a grain-threshing and winnowing machine; the former being constructed and arranged as herein described.

ROSWELL T. MERRILL.

No. 8032.—*Improved Saw Set.*

What I claim as of my own invention in the saw doctor, and wish to secure by letters patent of the United States, is the "adjustable double beveled slide saw rest," constructed and used substantially as herein described, by means of which its beveled bed, the tooth rest, upper jaw, and punch saws of all kinds can be firmly held, and their teeth be either set in V-form, shouldered in U-form, or be both shouldered and set to any amount required to insure any degree of smoothness or roughness in sawing, whether their points are sharp or rounded.

HIRAM STRAIT.

No. 8033.—*Improvement in Winnowing Machines.*

What I claim as my invention, and desire to secure by letters patent, are the blast passages, F, G, and *k*, arranged and controlled by the shutter, J, in the manner and for the purposes substantially as herein set forth.

JONATHAN L. BOOTH.

No. 8034.—*Improvement in Cooking Stoves.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, are the air passages *p, q, r*, between the fire-back, *l*, and the upper oven, the said passages receiving external air at the sides of the stove, and discharging it into the back flue, in combination with the damper, *m*, and flues *b, c, d, e, f, g, h*, substantially as herein described and represented, for the purpose of equalizing and regulating the heat to all parts of the ovens.

RUFUS K. PAINE.

No. 8035.—*Improvement in Material for transferring colors in Calico Printing.*

Having thus described the nature of my invention, and the manner in which the said invention must be used, I claim the use of extract of fibrine to form, with or without any other oily or fat matters, by the means which I have described, or any other equivalent means, a mastic adequate to thickening and retaining on fibres, threads, tissues, of every description, and of every material or substance, the archil color, and such other colors as are incorporated with that mastic.

I also claim the above process of preparing and purifying the extract of caseine, in order, by the means which I have specified, or any other equivalent means, to impart to fibres, threads, and tissues, of vegetable nature of every description, by means of a preparation of mordant, the property of better uniting to, or attracting, the coloring matter of archil, and, in general, other coloring matters, either in printing or dyeing, whether this preparation, or mordant, be applied on the fibres or threads of vegetable nature, previous to the weaving, or whether it be applied after the weaving on tissues of vegetable nature, or on tissues composed partly of vegetable and partly of animal substances.

C. A. BROQUETTE.

No. 8036.—*Improved Milling Tool.*

The rotary die for making impressions on metals and other substances is a well known instrument, and we make no claim founded on that instrument in itself considered.

But what we do claim, and desire to secure by letters patent, is the combination of such die with an axle, on which the same may vibrate, which axle is at right angles with the axis of rotation, and not in the same plane, substantially in the manner and for the purposes herein set forth.

JOHN BUCKINGHAM,
JOSEPH H. BAIRD.

No. 8037.—*Improvement in Mill Stones.*

What I claim as my invention, and desire to secure by letters patent, is constructing the running-stones of mills with oblique apertures, or passages, through the body of the stone, and provided with hoods or funnels, to collect the air during the rotation, and connected on the grinding face of the stone with furrows, substantially as described, when this arrangement is combined with the use of vertical pipes, leading from the extremity of one of the apertures or passages, to a funnel leading to the next succeeding oblique passage in the body of the stone, substantially in the manner and for the purpose specified.

E. T. HANON VALCKE.

No. 8038.—*Improvement in Iron Railings.*

What I claim as my invention, and desire to secure by letters patent, is securing the pailings permanently to the horizontal rods or bars of iron, for the purpose of constructing an entire section of railing by means of the methods of operating the rods or bars with the pailings, having jaws, recesses, and bearings, as described therein, and, together with other devices in castings, termed saddles or troughs, having dovetails and tenons cast to them for the purposes herein named; and this I claim, whether the several parts be formed and adapted to each other and operated precisely as represented and described, or otherwise; the results always produced being effected by means equivalent to those within named.

JOHN KRAUSER.

No. 8039.—*Improvements in the Steam Engine.*

What we claim as our invention, and desire to secure by letters patent, is—

First. The construction and arrangement of the columns by which the steam cylinder is connected with the bed frame in such manner that they constitute the air-pump and condenser, substantially as herein set forth.

Second. The method, herein described, of actuating the cut off valve of one steam cylinder by a motion derived from the valve or valve-rod of the other cylinder, substantially as herein set forth.

Third. The adjustable supplementary valve (*i*) in connexion with apertures or ports (*o*) in the steam valves, by means of which the steam can be worked at full pressure throughout the whole length of the stroke without disengaging the cut-off valve.

R. F. LOPER,
J. W. NYSTROM.

No. 8040.—*Improvement in Cooking Stoves.*

Having thus fully described my improvements, what I claim as new therein, and desire to secure by letters patent, is the apertures (*l'*) and passages (*n* and *o*) by which the air containing the surplus heat from the oven (*b*) is conveyed to the back of the fire-chamber, where it receives an access of heat, and afterwards to the flues, (*e*), by which arrangement the heat is equalized between the two ovens, and the upper one is ventilated, as set forth.

JAMES S. MARSH.

No. 8041.—*Improvement in Window Curtain Fixtures.*

Having thus described my improvement in window-curtain fixtures, I shall state my claim as follows: I do not claim generally confining one end of the curtain to the roller on which it is wound and unwound by means of a groove in said roller, and a confining strip; but what I do claim, and desire to have secured to me by letters patent, is the method or means, herein-above described, of fastening the confining bar in the groove of the roller in which the cloth is pressed—that is, by having the ends of said bar rebated as described, and fitting the caps at the ends of said roller, over said rebated ends of said bar, as above set forth; this arrangement of the caps and bar (the said caps, or one of them, being loose, so as to move laterally, but not to revolve, the sides of the rebated ends of the bar operating as shoulders to prevent a revolution) enables me to adapt my improved fixture to windows of different widths.

S. S. PUTNUM.

No. 8042.—*Improvement in setting Logs in Saw-Mills.*

Having thus fully, clearly, and exactly described the nature and operation of my invention, what I claim therein as new, and desire to secure by letters patent, is—

First. The vibrating dog (*i*) having the distance of its head or tongue, (*i'*) with respect to the saw, adjustable laterally by a set screw, (*g*), substantially as represented, so that, by placing the tongue of the head in each successive curf, and bringing the face of the log in contact therewith, the thickness of each consecutive board is exactly counterpart with the first.

Second. I claim, for analogous purposes, at the rear end of the log, which is destitute of a curf, the vibrating dog, (*p*), whose distance in respect to the stationary block (*q*) is adjustable by means of a set screw, (*l*), the range between the head of the dog and the block affording an easy and determinate means of giving exactly the same thickness to the boards at the rear end of the log.

JOHN W. ROBBINS.

No. 8043.—*Improvement in agitating Grate Bars.*

I do not claim the employment of a movable grate formed by bars C, C, and strips, c, c, the bars, C, C, working within the bars of the stationary grate; but what I do claim as my invention, and desire to secure by letters patent, is the application to the movable grate of two separate mechanical movements, whereby it may receive a rocking or a vertical vibratory motion at pleasure, the several parts constructed and operating substantially in the manner shown and described.

A. D. SPOOR.

No. 8044.—*Machine for cutting out the corners and scoring the edges of Paper for Boxes.*

Having thus fully described my machine for cutting boxes, what I claim as my invention, and desire to secure by letters patent, is the combination of the knife and dye, substantially in the manner and for the purpose herein described.

ANDREW DENNISON.

No. 8045.—*Improvement in Apparatus for operating Window Blind Slats.*

I am aware that cog-gearing has been employed for the purpose of operating window-blind slats from the interior of a building. I therefore do not claim such device in general.

But what I do claim as my invention, and desire to secure by letters patent, is making the cog wheel, E, with such a length of teeth that, when its spindle is forced outwards by the spring, they shall engage with the teeth on both sides of the cog wheel, F, thereby locking the same, and securing the slats in any desired position, substantially as herein described.

SAMUEL AVERY.

No. 8046.—*Improvement in Ornamenting Marble.*

What we claim as ours, and wish to secure by letters patent, is the above-described ink, and the wax color and etch-water used in combination therewith, substantially as described above.

HENRY HOFFMAN,
CHARLES FREDERICK HILL.No. 8047.—*Improvement in Cooking Stoves.*

My improvement, and what I claim, consists in the peculiar arrangement or manner of combining the fire-place—the descending or diving flues, the ash-pit, the lateral chambers, the ascending flues, the central discharge flue, the oven, or air heating chamber, and its surrounding flue space, all as represented in the drawings, and as hereinbefore specified.

DENNIS G. LITTLEFIELD.

No. 8048.—*Improvements in the process of manufacturing Glazed Sheet Iron.*

What we claim as our invention, and desire to secure by letters patent, is the employment of thick plates of iron as shield plates; or, in other words, placing four (more or less) thin plates between two shield plates of double weight, in forming packs for rolling, so that each shield plate will make two plates of proper size to constitute the inside plates of another pack, for the smoothing and finishing process of rolling.

JOHN WOOD,
WILLIAM W. WOOD.

No. 8049.—*Improvement in means of Renovating and Correcting Sight.*

What I claim as my invention, and wish to secure by letters patent, is the cups and caps to produce a pressure upon the periphery, in case of old age, or front of the eye in case of nearsight, which will increase or diminish its convexity, as the nature of the case may require, with their application, as set forth in the accompanying specifications and drawings, using for that purpose any of the materials named in the above specifications.

JONATHAN BALL.

No. 8050.—*Improvement in Cooking Stoves.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The arrangement of the flues which conduct the heated air to the space under the oven bottom, from which it is discharged into the oven at the corners thereof, and without any enlargement to permit the expansion of the air before it reaches the oven, as described, when this is combined with the arrangement of fire flues on each side thereof, as described, whereby the air passing to the oven is heated along the whole distance of its passage by the products of combustion from the fire place, as described.

I also claim as my invention the heating of the air in its passage through the back hot air chambers, by combining with such air chambers and the main fire flues the branch fire flues which pass back of the said air chambers, substantially as described.

CHARLES W. GRANNIS.

No. 8051.—*Improvement in machines for Gutta Percha tubing and covering Wire.*

What I claim as my invention, and desire to secure by letters patent, is the use, for the purposes specified, of feed-rollers, C, C, in combination with the stomach, G, G, having a lip, or mouth, h, arranged and operating substantially as shown and described.

JAMES REYNOLDS.

No. 8052.—*Improvement in Machines for Stretching Leather.*

I do not claim the shafts, wheels, chains, and vises by which the process of stretching is done; that may be effected by various mechanical arrangements.

I claim the method, or device, of stretching leather, especially for belting, by the use of apparatus so arranged that after a piece of leather has received, by an equable strain, applied to its ends for their whole width, the proper stretch that the material can bear on or along one edge thereof; if it be found that the other edge, and parts intermediate between it and the first edge, (from the difference in quality of fibre,) has not received its proper tension, the further stretching of the first side shall be stopped, whilst by the application of the mechanical stress at the other edge of the leather, it, and the parts between it and the first side, shall be duly stretched, substantially in the manner set forth in this specification.

I claim the holding board as essential in all leather-stretching apparatus, where it can be applied in keeping the material, whilst being stretched, from contracting in width, and becoming defective thereby.

I claim the holding board, with its clamps and wedges, in combination with the apparatus of stretching, for the uses and purposes substantially as set forth in the above specification.

BRADFORD ROWE.

No. 8053.—*Improvement in Clogs or Pattens.*

What I claim, therefore, as my invention, and desire to secure by letters patent, is the application of an elastic loop or strap attached to the sole piece, and going around the heel, substantially as in the manner above described.

CHARLES W. STEARNS.

No. 8054.—*Improvement in Machines for Stretching Leather.*

We claim the construction of the stretching apparatus, by connecting the free rod to the clamp, by entering the end or tenon of the rod into a mortise with angular sides, and securing them together by a pivot pin, substantially as set forth in this specification.

WILLIAM STREVELL,
DANIEL BROWN.

No. 8055.—*Improved Apparatus for rolling Tapered Metallic Rods.*

What I claim as my invention, and desire to secure by letters patent, is permitting the rollers to recede from each other by means of the hydraulic apparatus, constructed and arranged substantially as described.

And, secondly, the adjustable screw, K, figures 1 and 2, in conjunction with the apparatus claimed above, whereby bars of metal are enabled to be rolled taper for a portion of their length, and parallel for the remaining part thereof.

WILLIAM CLAY.

No. 8056.—*Improvement in Saw Mills.*

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as herein described, of driving belt saws by the friction surface of two cylindrical pulleys or drums, which gripe the

saw plate below the wood which is being cut, but at some part of its tangent line, so that the strain to which it must be subjected in cutting to keep it in the line of the tangent shall not beat any part of its curved path; but this I only claim in combination with straining rollers, which gripe the saw above the lumber on which it acts, the said rollers being controlled by a brake, or the equivalent thereof, substantially as described, whereby the saw, during its action, is kept in a strained condition along its entire line of action, that it may cut in a straight line, and to avoid its being under tension where the flexions take place along the curved portions of its track, as specified.

I also claim, in combination with the mode, herein specified, of driving a belt saw by means of cylindrical rollers or pulleys, the employment of a belt passing around the outer one of said driving rollers, and applied to the outer surface of the saw when it passes around the lower deflecting or guide pulleys, substantially as herein described, by means of which the saw is bent by the pressure of the belt, applied to its outer surface, instead of being communicated through the metal itself, thus avoiding, in a great measure, the tendency to break the metal.

And, finally, I claim, in combination with the mode, substantially such as herein described, of driving a belt saw, the employment of fenders or scrapers, interposed between the driving rollers and the wood to be sawed, and placed each side of the saw, as described, to catch the saw-dust and conduct it away from the sight of the driving rollers or the saw, and thus avoid clogging.

LEMUEL HEDGE.

No. 8057.—*Improvement in Coffee Roasters.*

What I claim is the combining or arrangement of the fire place or chamber of combustion, the roasting cylinder, and its surrounding chamber, substantially in the manner as above described, and as represented in the drawings; also the arrangement of the flue of the fire chamber, with respect to the latter, and the enclosing chamber of the roaster, the said arrangement of the said flue consisting in carrying it over and in contact with the top of the said enclosing chamber, as specified.

I also claim the arrangement of the proving tube within the hollow journals and central part of the roaster; not meaning to claim the device termed the proving tube, but simply its arrangement, as specified.

EDWARD WHITELEY.

No. 8058.—*Improvement in Straw Cutters.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the manner, herein described, of arranging one or more cutters on the periphery of a vertical wheel, at such angle with, and so extending over, the face of said wheel as will give a "drawing cut" through the straw or other material to be cut, and at the same time catch and carry the material as it falls to the opposite side of the wheel from where it is cut, thus removing the cut material out of the way of the feeding box and uncut material, as fully set forth and shown

T. F. WINGO.

No. 8059.—*Improvement in Car Seats.*

Having thus described the nature of our invention, what we claim as new, and desire to secure by letters patent, is the mode, herein described, of reversing the back of car seats from one side of the seat to the other, without turning them over, by means of arms, constructed and arranged as set forth, by which any desired height of back is obtained, as described.

Secondly. We claim the manner, herein described, of reversing the concave back on a movable frame, in combination with the side locking projections, as described.

RICKASON STILWELL,
E. L. BRUNDAGE.

No. 8060.—*Improved Lock and Key.*

What I claim as my invention is the wedged or cam key, I, and the separate bitt, or secondary wedged or cam key, H, in combination with the vibrating block, F, the key recess, and the tumbler elevator; the whole being constructed, arranged, and operating substantially as herein before specified.

JAMES R. BUGBEE.

No. 8061.—*Improvement in Smut Machines.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the manner, herein described, of scouring and freeing wheat of smut and other impurities, by throwing up the grain into the inclined face of a chimney, fitted to an opening along the top of the concave, in combination with the inclined aprons, U, for transferring the grain from end to end of the cylinder, that it may be discharged as set forth.

JEHU HOLLINGSWORTH.

No. 8062.—*Improved Compound Metallic Door for Vaults, Safes, &c.*

What I claim as my invention, and desire to secure by letters patent, is a door or wall for a vault or safe, made by securing to each other, at a certain distance apart, two plates of sheet metal, provided with a rim or curb, and filling the vacant space between them with immalleable cast-iron, poured in while melted, substantially in the manner herein described.

IRA L. CADY.

No. 8063.—*Improvements in Winnowing Machines.*

Having thus fully described my improved wheat-fan, what I claim as new therein, and which I desire to secure by letters patent, is, first, placing the screen (*d*) in an inclined position above the fan, and extending the whole length of the machine, by which the wheat is thoroughly sifted before being acted on by the blast, in combination with the direction of the blast at right angles, to the screen as above set forth.

OLIVER ETNIER.

No. 8064.—*Improvement in Spring Saddles.*

Having thus described my bridge-spring saddle tree, what I claim therein as new, and desire to secure by letters patent, is the pommel-spring, in combination with the seat-springs, substantially as herein set forth.

I also claim the method of suspending the stirrups by connecting them with the same springs which support the seat, whereby the elevation and depression of the one is simultaneous with the elevation and depression of the other.

JOSEPH C. SMITH.

No. 8065.—*Improvement in Apparatus for giving ease to the Arm in Writing.*

Having thus described our invention and improvement, and shown the application of the same to the arm of the pendulum, what we claim as our invention, and desire to secure by letters patent, is constructing an arm-supporter, or rest, so formed and shaped as to fit the arm below the elbow-joint, and serve as an elastic or flexible support, or rest, on which the arm of the penman is supported and balanced, and permitted to move or turn with the motion of the arm, with the utmost freedom and ease to the writer, by which all numbness, contraction of the muscles of the fingers, and crampness or stiffness of the arm are effectually prevented, and the arm rendered free in its movement, and under the complete control of the writer, as fully described and represented.

JOSEPH G. GROSHEN.

WILLIAM H. TOWERS.

No. 8066.—*Improvement in Machinery for Making Matches.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The mode of feeding in the plates of wood, by means of the feeding apron, with its cleats, spring pulley, F, and rollers, g, g.

Second. The mode of separating and dipping the splints by means of the grooved cylinder, C, cutter, n, endless bands, B, and revolving wheels, e, e.

IRA H. SMITH.

No. 8067.—*Improved Horse-shoe Machine.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is in combination with a rotating travelling-draw roller, adjustable pattern, and champering tool, for forming the shoe, the gauge plate, for holding up the roller, so as to allow it to return over the shoe thus formed, and smooth down the feathered edges, raised by the champering tool, as herein described and represented.

ROBERT G. BABCOCK.

No. 8068.—*Improvement in Bats for Felting.*

I am aware that flock has been incorporated with wool in the manufacture of felting, by passing it through the carding machine with the wool, and also that it has been fulled on to the surface of the cloth during the process of finishing.

I therefore do not claim either of these, as such, as my invention; but what I claim as my invention, and desire to secure by letters patent, is preparing the web for felt fabrics, by the introduction of layers of flocks between or upon the layers of wool, without passing the flock through the carding-machine, but by preparing it in a separate machine, and introducing it immediately from that machine on to the web of wool, while it is passing from the carding-machine, in the manner substantially as herein described.

And I also claim as my invention the combination of the endless apron, (K,) which feeds the flock to the cylindrical brushes, with the series of cylindrical brushes, by which the flock is taken up from the inner extremity of the endless apron, and (passing through the series) is prepared, and sent down through the spout, or conductor, (A,) and deposited on the web of wool, (as before described,) when the same is constructed and combined substantially as herein described.

LEANDER W. BOYNTON.

No. 8069.—*Improvements in Splint Machines.*

What I claim as my invention, and desire to secure by letters patent, is a cutter wheel, constructed substantially as herein set forth, to split, point, and gauge the size of match splints, in combination with the method of preventing the splitting knives from cutting across the grain of the wood by supporting the block upon a stock, which is constructed to turn, as herein set forth, to present the grain of the wood, where the splitting knife is acting, in line with the plain in which the knives revolve.

LEWIS L. GILLILAND.

No. 8070.—*Flexible Hose, or Float for supporting Vessels.*

Having thus fully described my invention, that which I claim, and desire to secure by letters patent of the United States, is as follows:

First. I claim a plan of supporting a vessel, in whole or part, upon or by means of a *flexible*, movable, endless hose, or "air-float," or on an endless, movable chain of flexible, buoyant compartments, for the purposes set forth.

Second. I claim making my flexible hose, "air-float," or its equivalent, *collapsible*, for the purposes herein before mentioned; not limiting myself, in or by these claims, to any particular forms or arrangement of the buoys or floats, &c., so long as the peculiar features of my invention, as described and claimed, are substantially fulfilled.

WM. MT. STORM.

No. 8071.—*Improved Lock and Key.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The self-detaching and attaching key for the purpose and object described.

Secondly. In combination with said key, I claim a powder-proof key-hole, consisting of two or more parts, so constructed that the outer part is turned by the key, while at the same time the inner parts, with the pod or pods of the key enclosed, are disconnected and moved entirely away from the outer; the same movement causing solid metal to occupy the space left, and thus to effectually bar an entrance of any kind to the lock when its parts are in a position possible to be unlocked.

LINUS YALE, JR.

No. 8072.—*Improvement in Meat-Cutting Machines.*

What I claim as my invention, and desire to secure by letters patent, is the herein-described mode of adjusting the cutters, J, by means of the adjusting plates, K, as described.

THOMAS VANDERSLICE.

No. 8073.—*Exploding Harpoon.*

I do not claim the invention of the harpoon as ordinarily made, but what I claim as my invention, and wish to secure by letters patent, is—

First. The interior of the harpoon made as a pistol barrel, with percussion lock, protected from water or outward accident, and the trigger of which can be actuated by means of a pull on the line and the resistance of the flesh, substantially as described.

Second. I claim the making the point of the harpoon, the projectile which is shot into the whale, in the manner and for the purposes substantially as described.

Third. I claim the arrangement of the trigger, in the shank under the barb, in the mode described, preventing the explosion of the charge till the line is drawn by the whale or the harpooner.

CHARLES BURT.

No. 8074.—*Improvement in Hand Logs.*

All the parts, taken separately, and described herein, as used by me for this purpose, are well known, and have long been applied to other uses. But I do not know of any invention in which the application, arrangement, and combination of these parts have been used to produce an instrument, that, through mechanical means, denotes, with nearly or quite mathematical certainty, the rate in miles per hour at which a ship travels through the water during a fixed, limited, and known time.

I therefore claim as new, and of my own invention, and desire to secure by letters patent of the United States—

First. The arrangement of the log-glass, F, lever, g, pinion, e, and wheel, f, whereby the motion given to the clock-work by the reel, G, is communicated to the index, 9, during a definite period of time, determined by turning the log-glass on or off the lever, g, the parts being so

proportioned, and the dial so divided, that the index, moving while the sand is running in the log-glass, F, shows the rate of speed at which a vessel is moving per hour of time, during 14 seconds, or any other known space of time, the parts being arranged and operating substantially as described, or in a manner equivalent, to produce the same results by like means.

Second. The application of a parachute, K, to the purpose of a "log-ship," and the combination therewith of the cylindrical wedge, m, or its equivalent, to enter between the tubes, k and n, to keep the "log-ship," K, spread when in the water, and disengaged when hauled on to "fetch home," so that the log-ship closes, and turns end for end in the water, and is easily hauled on board, said log-ship being used with the reel and registering parts herein described and shown, or with any other means of supplying and determining the amount of line run out, during a known period of time, substantially as described and shown.

JOHN R. ST. JOHN.

No. 8075.—*Improvement in the manufacture of India Rubber.*

I do not claim the heating or curing process, as it is termed; that having been patented by Charles Goodyear.

What I do claim as my invention, and desire to secure by letters patent, is the combining of India-rubber and sulphur, either with or without shellac, for making a hard and inflexible substance, hitherto unknown, substantially as herein set forth.

And I also claim the combining of India-rubber, sulphur, and magnesia, or lime, or a carbonate, or a sulphate of magnesia, or of lime, either with or without shellac, for making a hard and inflexible substance, hitherto unknown, substantially as herein set forth.

NELSON GOODYEAR.

No. 8076.—*Improvement in Bedstead Fastenings.*

Having thus described our improvement on the bedstead fastening, what we claim therein as new, and desire to secure by letters patent, is providing the upper section or part, B, of the cylindrical box with a triangular and two parallel wedge-shaped wings, D, E, E, made sharp, and projecting from its periphery in such a manner that the triangular projection, D, shall open a groove or way in the post, which shall be closed by the entrance of the parallel wedge-shaped wings, E, E, which follow, as the section, B, is driven into the post, and thus crowd the wood in front of the shoulder (a) of the triangular projection, D, and form a complete lock thereto, as described.

We also claim dividing the cylindrical box longitudinally into two equal parts or sections, B, F, the line of division inclining upward at an angle of about ten degrees from a horizontal plane, by which the edges of the upper section, B, are made to serve the purpose of wedges for forcing the teeth of the lower section, F, into the post and holding it securely, as described.

JAMES R. KAIN,
SPENCER LEWIS.

No. 8077.—*Improved Spark-Arrester.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is—

First. The air-flues (F) in the lower part of the diaphragm, (O,) constructed in the manner and for the purposes herein described.

Second. I claim the pipes or conductors, (H,) in combination with the air-chamber, (I,) and (B,) arranged substantially as herein described.

Third. I claim the combination and arrangement of the air-flues, F, with the air-chamber, (B,) reverberating cone, (C,) inclined and curved flues, (D,) for the purpose and in the manner herein fully set forth and described.

JAMES A. CUTTING.

No. 8078.—*Improvement in Pumps.*

What I claim as my invention, and desire to secure by letters patent, is the combination and arrangement of the valve-chest, water-passages, pump-cylinder, and air-vessel, as herein described, so that the whole can be cast in a single piece, and the valves and suction pipe supported and secured in place by another piece, also cast in the form herein described, whereby the cost of making the pump, and its liability to get out of order, are both lessened, without impairing its efficiency, or rendering it more difficult to repair.

NELSON NEWMAN.

No. 8079.—*Improvement in Lime-Kilns.*

Having thus fully described the construction and operation of my improved lime-kiln, what I claim therein as new, and desire to secure by letters patent, are the flues, *d, d*, encircling the cupola, and provided with apertures or flues, *e, e, e, e, e*, for admitting the heat and flame to the action upon the lime-stone from various points, substantially as described, in combination with the air-chamber, K, encircling the cupola, as described; and I claim also the aperture, *p*, and passage therefrom, for saving the heat arising from the manufactured lime while being removed; all operating conjointly in the manner and for the purpose herein fully set forth.

RICHARD E. SCHROEDER.

No. 8080.—*Improved process for the artificial production of Ice.*

Having thus fully made known my improved process of manufacturing ice, and explained and exemplified suitable machinery for carrying the same practically into operation, I wish it to be understood that I do not claim, as my invention, any of the several parts of the apparatus in themselves; but what I do claim as my invention, and desire to secure by letters patent, is—

First. The employment of a liquid, uncongealable at the low temperature at which it is required to keep the engine, to receive the heat of the water to be congealed, and give it out to the expanding air.

Second. I claim the employment of an engine for the purpose of rendering the expansion of the condensed air gradual, in order to obtain its full refrigeratory effects, and, at the same time, render available the mechanical force with which it tends to dilate to aid in working the condensing pump, irrespective of the manner in which the several parts are made, arranged, and operated.

Third. I claim supplying the water gradually and slowly to the freezing vessels, and congealing it by abstracting the heat from its under surface, substantially as herein set forth; and,

Lastly. I claim the process of cooling or freezing liquids, by compressing air into a reservoir, abstracting the heat evolved in the compression by means of a jet of water; allowing the compressed air to expand in an engine, surrounded by a cistern of unfreezable liquid, which is continually injected into the engine and returned to the cistern, and which serves as a medium to absorb the heat from the liquid to be cooled or frozen, and give it out to the expanding air.

JOHN GORRIE.

No. 8081.—*Improvement in Purifying Illuminating Gas.*

What I claim as of my own invention and discovery, and desire to secure by letters patent of the United States, is the purifying powder for illuminating gas, said powder consisting of sulphate of lime, either natural or artificial, in connexion with some inert substance or substances, partly inert and partly rendered purifiers when compounded in the proportions substantially as described herein.

FLORENTINE JOSEPH DE CAVAILLON.

No. 8082.—*Machine for assorting Screw Blanks, &c.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the series of shifting ways with the main or stationary ways, for the purpose and in the manner substantially as specified.

And I also claim the detector, substantially as specified, in combination with the stationary and the shifting ways, substantially in the manner and for the purpose specified.

THOMAS J. SLOAN.

No. 8083.—*Improvement in Grain Harvesters and Binders.*

Having thus specified our improvements in harvesting machines, what we claim as our invention, and desire to secure by letters patent, is—

First. The method of raking and binding grain at one operation by the mechanism herein specified, or its equivalent, substantially as herein set forth.

Second. We claim the arms, *m*, in combination with the levers, *p*, by means of which the rake teeth are alternately raised and depressed as the rake is moved alternately in opposite directions by endless rake chains, which move continually in the same direction.

Third. We claim the method of adapting the binding apparatus to the length of the cut grain by varying the respective positions of the

cutting and binding apparatus, substantially as herein set forth; that is to say, by moving the front of the platform with the cutting apparatus, backward or forward, or by moving the binding apparatus nearer to or further from the front of the platform in such manner that the sheaf may be bound near the middle of its length, whether it be long or short.

Fourth. The method of binding grain by the mechanical devices herein specified, or their equivalents, acting in connexion, and automatically by motion derived from, or dependent upon, the movement of the machine to which they are attached.

Fifth. We claim the cord finger (B,) operating substantially as herein set forth, by the aid of which the grain is encircled by the binding cord.

Sixth. We claim the tying forceps, or the equivalent thereof, operating in connexion with mechanism for encircling the grain with cord or band, substantially as herein set forth.

WILLIAM WATSON,
E. SABINE RENWICK,
P. HILL WATSON.

No. 8084.—*Improvement in Straw Cutters.*

Having thus fully described my improved straw cutter, what I claim therein as new, and desire to secure by letters patent, is, in combination with the toothed grooved cylinder, and curved stationary knives, the cleaners, *g, g*, arranged and operating substantially as herein represented and fully shown.

JONATHAN SULLIVAN.

No. 8085.—*Improved method of supporting the Vanes of Aquatic Velocimeters.*

Having thus described my invention, and set forth the means I employ, and the differences between my invention and those that are known to have preceded it, I do not intend to claim any of the parts herein described as taken separately; all are well known, and in common use; but what I do claim as new, and of my own invention, and desire to secure by letters patent of the United States, is the attaching the disk or plate, *a*, to the sliding frames, *b* and *c*, which frame, *c*, carries the shaft, *d*, of the paddle blades, *B*, when said frame and plate are fitted to be lowered into or raised out of a tube, *A*, in such a manner that when in place for use, the plate, *a*, prevents any indirect current of water from ascending into, or descending out of the tube, *A*, to disturb or destroy the accuracy of the instrument, leaving the paddle blades, *B*, subject only to the direct action of the vessel's progress through the water, substantially as described and shown.

JNO. R. ST. JOHN.

No. 8086.—*Improvement in Planing Machines.*

What we claim as our invention, and desire to secure by letters patent, is the employment on one or both sides of the grooving cutters, *b, b, b*, of a chain or band, *c*, applied and operated in the manner substantially as and for the purpose herein described.

RUFUS BIXBY,
CYRUS S. BIXBY,
JOHN GARST.

No. 8087.—*Improved Apparatus for relieving the helmsman from the shock of the Rudder.*

What I claim as my invention, and desire to secure by letters patent, is the combination of two sets of pawls, between which two sets of pawls a wheel is placed loose upon the shaft, having an endwise motion thereon, by means of the male and female screw, as described; said wheel being provided with a hub, so fitted as to disengage the pawls when the hub arrives at the limit of its end play, in either direction; the result being that the rudder secures itself through the agency of the pawls, and is unlocked, so as to be free to move in either direction by the first motion of the same wheel which afterwards moves the rudder; in other words, I claim the combination of the hub secured to the wheel, the male and female screws, or their equivalents, and the ratchets and pawls, substantially in the manner and for the purposes described in this specification.

CHANDOS HOSKYNs.

No. 8088.—*Improved Apparatus for indicating the height of water in Steam Boilers, &c.*

What I claim as my invention, and desire to secure by letters patent of the United States, is the combination of the chamber, D, with the boiler or other vessel, in which the height of fluids is to be measured, by means of tubes, so formed and attached as to act as springs, to indicate the weight of the water at any time within said chamber, for the purpose and substantially in the manner herein set forth.

GEORGE FABER.

No. 8089.—*Improvements in Flouring Apparatus.*

Having thus described my improvements, what I claim as new therein, and desire to secure by letters patent, is—

First. I claim the arrangement of the "hopper boy," revolving on the same centre as the stone, and the chamber beneath the stone, by which the flour is cooled as it is conveyed to the centre opening of the bolt, substantially as set forth.

Second. I claim the annular or endless conveyers for conveying the flour, &c., in the several annular chambers to the spouts, the same being operated in the manner herein described.

Third. I claim, in combination therewith, the air passage (W) for returning the particles of flour which would otherwise escape to the centre hole of the floor of the bolting chamber, to be drawn in again by the draught, substantially in the manner set forth.

JAMES M. CLARK.

No. 8090.—*Crane Hinge for Doors, Shutters, &c.*

What I claim as my invention, and desire to secure by letters patent, is the crane door-hinge, constructed in the manner and for the purpose as herein substantially represented and set forth.

EZRA RIPLEY.

No. 8091.—*Improvement in Setting Teeth.*

What I claim as my invention, and desire to secure by letters patent, is attaching artificial teeth to a plate in the roof of the mouth, by means of a wedge-formed recess in the tooth, and a pivot of corresponding shape, soldered, or otherwise attached to the plate, when the union of the two is effected by the use of platinum and tin, or solder, substantially in the manner and for the purpose specified.

ADOLPH F. AHRENS.

No. 8092.—*Improvement in Setting Teeth.*

What I claim as my invention, and desire to secure by letters patent, is securing artificial teeth to a plate in the roof of the mouth by means of a rebate in the inner face of the tooth and a slide, fitting the same and soldered, or otherwise attached to the plate in the mouth, for the purposes and in the manner described.

ADOLPH F. AHRENS.

No. 8093.—*Improvement in Brick Presses.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The form of the pressing plates, *n, n, n*, thicker at one edge than the other, as shown, and for the purpose described.

Second. The motion of the followers, or plungers, *E², E², E²*, by rollers moving in fixed grooved channels, *F, F*, and acted upon by revolving cams, *k, k*, producing a drop movement, and operating as herein shown and explained.

Third. Propelling the machine forwards by means of wheels, *D, D*, keyed on the mould cylinder-shaft, for the purpose of depositing the bricks, as made in regular layers, for drying.

JOS. GRANT.

No. 8094.—*Improvements in Saw Mills.*

Having thus fully described the nature of my improvements, and the manner in which they operate, in producing the desired effect, what I claim as my invention is—

First. The tightener and key, and the manner in which they are used in tightening the dogs, as herein set forth.

Second. I claim the movable arm to regulate the thickness to be sawed, when changing from one thickness to another in the same log, without taking the dog out of the log, as herein described.

Third. I claim the placing the second dog upon the main plate and adjusted by the bolt and key, constructed in the form and manner and for the objects and purposes hereinbefore particularly set forth.

No other part of the said above-described dogs do I in this, my specification, claim as new or original, excepting such as above enumerated.

MARTIN RICH.

No. 8095.—*Improvement in Scarificators.*

What I claim as my invention, and wish to secure by letters patent, is the use of the said hollow pivot, lever, and slide racks, combined and arranged as described, secured in their proper places by the plate and screws, and operating in connexion with the trigger and springs, substantially as hereinbefore specified.

FREDERICK LEYPOLDT.

No. 8096.—*Improved Compound Coupling for Hose or Pipe.*

What I claim as my invention, and desire to secure by letters patent, is the manner, if desired, of keeping the several threads or screws always in contact, whether the coupling be formed or disconnected, for obtaining the advantages set forth, by employment of an interior box, C, situate in an outer box, B, and having a loose ring or collar, D, or its equivalent, on it, in combination with a washer, F, connecting nut, E, and box, A, formed with the lips for locking the coupling, the several parts constructed, fitting, and operating together substantially as shown and described.

JAMES W. OSGOOD.

No. 8097.—*Improvement in Smut Machines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. In connexion with a close case surrounding the machine, the arrangement of the fan, as herein described, in the annular space surrounding the beaters between the outer case and the fluted cylinder, and at the entrance of the pipe, M, through which the dust is discharged, so that currents of air will set into the machine through any cracks or openings in the same from the room in which it is placed, by which means the escape of pulverized dust or smut into the room is effectually prevented.

Second. I claim the arrangement of the air chamber, W, having currents of air passing through and across it, between the upper part of the beater and the space through which the descending current of air passes to the fan, for the purpose of collecting any portion of the grain accidentally thrown out of the scouring cylinder by the blast or beaters, and returning the same, so that it may pass through the machine with the rest of the grain in the proper direction.

Third. I claim the conical rim or shield for the purpose of protecting the conical screen below it from abrasion by the descending grain, and at the same time keeping the pores of the screen open for a free passage of air through it into the fluted cylinder.

Fourth. I claim the tube or passage (K) for discharging the cleaned grain, as set forth, and also for receiving and transmitting air to and through the tube, J, as described.

NELSON PLATT.

No. 8098.—*Improvement in Planing Machines.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the yielding stock and

cutter, when made to yield upon an axle, the centre of which is in line with the cutting edge of the knife; and this I claim, whether the socket bolt, hinged bar, and nut are, or are not, used for the purpose of graduating and adjusting the cutters, as herein set forth.

GEORGE W. BEARDSLEE.

No. 8099.—*Coupling for Cords.*

What I claim as my invention, and desire to secure by letters patent, is the use of half couplings, A, A, (each of similar shape and construction,) formed with lips, *a, a*, having slots, *b, b*, into which projecting hooks, C, C, fit, having notches, *c, c*, serving for the bolts, D, D, to enter and lock the coupling, or constructed and operating for the purposes shown, in any manner substantially the same.

LAWTON J. WARE.

No. 8100.—*Improvement in India Rubber Shoes.*

Having described the advantages of my improvement, and the best way known to me of manufacturing the same, what I claim as my invention, and desire to secure by letters patent, is the manufacture of rubber boots and shoes without cloth, being made of separate pieces of different degrees of elasticity, and each piece having its peculiar and requisite degree, the shoe to possess different degrees of elasticity in different parts, and uniform elasticity in each different part, and having no part without some elasticity in every direction, by the means herein described, or any other substantially the same, whereby I lessen the cost, obtain a shoe not liable to break, which can be kept clean, stretched in every direction at the same time, easier to the foot, adjustable to larger boots, and yet not rendered useless to wear over smaller, light and elegant, and retain permanently their shape.

HORACE H. DAY.

No. 8101.—*Improvement in Reflecting Fire Plates.*

I do not claim as my invention a reflector made to partially surround the fire; but what I claim as my improvement is the extension of the curved reflector entirely around the fire grate, in combination with having an opening through it, immediately under the fire grate, for the passage of the ashes, as specified.

And, in combination with the fire grate and the extension of the reflector under or below the grate, essentially as explained, I claim the ash-guard, F, the same being applied in manner and for the purpose as set forth.

And, in combination with the reflector, B, and its sustaining frame, I claim the hinged slide, H, and the sustaining rollers, K, K, K, K, or their mechanical equivalent; the same being applied so as to enable the reflector to be moved outward for the purpose of providing easy access to the chimney, or for convenience of removing the ashes, whenever such may be deemed necessary.

ROBERT JOBSON.

No. 8102.—*Improvements in the Manufacture of Wire-Strengthened Spoons.*

I do not claim employing a wire within the handle, as such has already been done; but what I do claim as my invention, and desire to secure by letters patent, is the manner, substantially as herein shown and specified, of enclosing a wire of the required exact length within the handle, by supporting it on "points" secured to the mould, and projecting midway or partly into the form.

LUTHER BOARDMAN.

No. 8103.—*Improvement in Steam Traps.*

We do not claim to be the first to remove the water of condensation from steam-warming or other apparatus by means of a float and valve or cock, but we do not know of any means by which this water of condensation is taken off through the float by a cock. Therefore, what we claim as new, and of our invention, and desire to secure by letters patent of the United States, is the construction and application of the float, *E*, with its mouth, *6*, opening, *5*, pipe, *l*, and barrel, *k*, on the plug, *i*, with the openings, *3* and *4*, for the purpose of retaining the steam in warming apparatus, or in other steam pipes, and passing out the water of condensation through the float near the bottom, substantially as described and shown.

CHARLES M. GUILD.

JOHN BROWN.

No. 8104.—*Improvement in Hot Air Furnaces.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement, substantially as herein described, of the heating chambers in connexion with the furnace, when this is combined with the method, substantially as described, of connecting the heating chambers with each other with the furnace and with the exit pipe leading to the chimney, whereby the gaseous products of combustion are carried into and through, and made to spread out in thin films in the said heating chambers, and therein retained to give out heat without seriously impeding the draught, substantially as described.

SAMUEL PIERCE.

No. 8105.—*Improvement in Carriage Springs.*

What I claim as new, and desire to secure by letters patent, is the constructing of springs, whether of wood or part wood and part metal, or other elastic or non-elastic substances, as adapted and applicable to carriage springs, and springs for other purposes, in the manner substantially as herein described.

LEVI BISSELL.

No. 8106. *Improvement in Cast Iron Car Wheels.*

What I claim as my invention is the above-described improvement or wheel, made with a chilled rim, either a solid hub or one divided cross-

wise of its axis, two plates or disks, B, C, united in a serpentine curve at their outer peripheries, a third plate, D, not only made serpentine concentrically with the hub, but curved in radical directions, as described, all cast or founded, and combined together in one piece, substantially in the manner as hereinbefore specified.

ALBERT HEBBERD.

No. 8107.—*Improved Gauging and Heading Movement for Spike Machines.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the spring gauge and catch, *o, p, r*, constructed as herein described, with the dies and with the header, F, for the double purpose of gauging the length of the spikes or nails, and aiding in forming the heads thereon, substantially as herein set forth.

PURNEL JEFFERSON.

No. 8108.—*Improvement in Cast Iron Car Wheels.*

Having thus explained my invention, I claim a cast iron railroad wheel, constructed with the solid hub, A, and the tube, C, the said tube being united to the hub by a curved plate, B, with curved projecting braces, *b, b*, on it, and connected to the tread, T, by a curved plate, D, with the curved braces, *d, d*, on it, the whole being constructed substantially as described, for the purpose set forth.

ISAAC VAN KURAN.

No. 8109.—*Improvement in Ventilating Furnaces.*

What I claim is the arrangement and mode of operating the valves, A, A, in reference to the air-heating space around the stove, by which the amount of air from within and without is graduated by a single movement.

I claim also the arrangement of the horizontal air-heating trunk, the vertical, D, leading thereto, and its valve, S, in combination with the air-heating space, G.

H. RUTTAN.

No. 8110.—*Improvement in Lifting Jacks.*

I do not claim any of the parts employed, irrespective of the manner in which they are combined and arranged. But what I claim as new, and desire to secure by letters patent, is the combination, in the manner substantially as herein described, of the pawls, *f, f'*, the spring, *o* and *i'*, *i'*, and the spring lever, *k*, having projections, 1, 2, on each side of its fulcrum, with the lever, D, and the ratchet, *a, b*, on the lifting rod, B, whereby the lifting rod may be forced out from or drawn into the post, or standard of the jack, according to the position of the spring lever.

BOLIVAR NEWBURY.

No. 8111.—*Improvement in Lap Anvils for Shoemakers.*

What I claim as my invention, and desire to secure by letters patent, is a metal anvil, shaped substantially as set forth and described in the

within specification, with its drawings—that is, with a form adapting it to be held conveniently upon and between the knees and thighs of a workman, having a projection above the mass of metal, conveniently formed into an anvil face, with a small prismatic block near the extremity of one of the arms, as a fulcrum for nippers, when the same are used in stretching or manipulating leather.

HENRY BRUNK.

No. 8112.—*Improved Combination of Dies for Sheet Lead Machines.*

Having thus described my invention, and the manner of its application to the foregoing machines for the manufacture of sheet lead, what I claim as my invention, and desire to secure by letters patent, is the adjustable interior cylindrical and the exterior stationary conical dies, in combination, and for the purposes described, irrespective of the precise manner in which they are applied, or by which the adjustment is effected.

JOHN ROBERTSON.

No. 8113.—*Improved Vise Jaw for Saw Filing Machinery.*

What I claim as my invention, and desire to secure by letters patent, is the jaws of the vise shaped to correspond to the shape of the saw teeth, and support the same, so as to prevent vibration during the operation of filing, as herein set forth, whereby a better edge is given to the tooth, the wear of the file is diminished, and the process of sharpening expedited.

GEO. W. PUTNAM.

No. 8114.—*Improvement in alloy of Iron, Zinc, and Nickel.*

What I claim as my invention, and desire to secure by letters patent, is the making of wrought or malleable iron, either from ordinary iron or from the ore, by the use of application of metallic zinc or spelter, and by the use of zinc and nickel, combined as hereinbefore described and set forth.

OTIS BOYDEN.

No. 8115.—*Improvement in Machinery for Hardening and Straightening Saws, &c.*

Having thus fully described my improvements in the method of straightening and hardening saws, &c., what I claim therein as new, and for which I desire to secure letters patent, is the employment of the apparatus above set forth for straightening and hardening steel plates for saws, &c., at one operation, consisting of the fingers or cams, substantially as described, which support the article to be straightened, compressed, and hardened, combined with and gripped by the drop, in the manner and for the purpose above specified.

HENRY WATERMAN.

No. 8116.—*Improvement in Seed Planters.*

Having thus fully described the nature, construction, and operation of my seed drill, what I claim therein as new, and desire to secure by letters

patent, is the conical cups attached to segmental rods, extending from levers working on a horizontal shaft, raised and lowered by the eccentrics and rods, substantially as described, operating in the manner and for the purpose herein fully set forth and represented.

JACOB BARNHILL.

No. 8117.—*Improvement in Portable Swings.*

Having thus fully described the construction and operation of my improvement in portable swings, what I claim therein as new, and of my invention, and desire to secure by letters patent, is the suspension of a swing to the hinged frame, supported or strengthened by the adjustable brace, C, substantially as herein set forth.

ENOCH S. FARSEN.

No. 8118.—*Improvement in Carriages.*

What I claim as my invention, and desire to secure by letters patent, is making the sides of the bodies or boxes of carriages of a series of springs, slats, or bars, when the same are constructed, and operate, substantially as herein set forth and described.

GEORGE B. DURKEE.

No. 8119.—*Improvement in Omnibus Steps.*

Having thus described the nature of my invention, and the manner in which it is constructed, what I claim as new, and desire to secure by letters patent, is the manner of constructing the step as described, viz: by having a portion (B) of the body of the omnibus projecting downwards a suitable distance, the bottom of said projection, B, forming the step, C, and so arranged as to be perfectly covered and protected by the door, D, when closed, substantially as described.

W. H. HOYT.

No. 8120.—*Improvement in Carriages.*

What I claim as my invention and desire to secure by letters patent, is the manner of construction, as described, viz: forming the body of two separate parts, A, B, united by a joint which allows the body to vibrate and act upon a single spring, and also admits of a direct attachment of the body to the axles, substantially as set forth.

JAMES C. SPENCER.

No. 8121.—*Improvement in excluding Dust from Railroad Cars.*

What I claim as my invention, and desire to secure by letters patent, is the application of vertical blinds, shutters, or screens on the outside of railroad cars, employing the same to prevent the entrance of dust, smoke, cinders, &c., into the windows of the cars, as herein described.

EDWARD HAMILTON.

No. 8122.—*Improvements in Hemp Brakes.*

What I claim as my invention, and wish to secure by letters patent, is the combining a sufficient number of slats to break the full length of the hemp at once, in combination with the manner of feeding, substantially as set forth.

PARIS M. WALKER.

No. 8123.—*Improvement in Self-weighing Machines for Grain.*

Having thus described my self-weighing machine for grain, and shown the operation of the same, I desire that it shall be understood that I do not claim a self-weighing machine operated by the weight of the grain, so as to form an automatic weighing machine, by which, with the aid of a register or index, the amount weighed is ascertained, nor do I claim opening a gate or door in the bottom of a receiving hopper by the descent of a steelyard simultaneously with the discharge of the grain from a rotating hopper; but what I do claim as new, and of my own invention, is the employment of the metallic plate, C, or its equivalent, attached to the receiving hopper, B, and made to rise and fall by the action of said hopper and a gauge, Q', in such a manner that on the descent of a suspended hopper, F, the gauge-plate, Q, connected therewith, will disengage a catch-plate (*f*) from the right end of the metallic plate, C, and permit the latter to fall and cut off the discharge of the grain, and simultaneously therewith open a trap-door, H, in the bottom of the suspended hopper, and on the ascent of the same the receiving hopper, B, will be made to tilt frontward by the weight of the grain, so as again to raise the plate, C, and open the hinged door, D, of the said plate, C, simultaneously with the closing of the trap-door, as fully described and represented.

I also claim the employment of the gauge-plate, Q', when combined with the lower or discharging hopper, F, for the purpose of determining the quantity of grain to be weighed by limiting the descending movement of the suspended hopper, F, and consequently gauging the action of the projection, Q², on said gauge-plate, Q', to actuate the plate, C, to cut off the discharge of the grain from the receiving hopper.

I also claim the employment of the vertical pendant rods, P, R, confined to either side of the frame when combined with a suspended hopper, F, provided with a trap-door, H, for the purpose of opening and closing said trap-door by their descent alternately, said vertical pendant rods, P, R, being respectively actuated by the descent of the metallic plate, C, to disengage the spring catch (*t*) from the rod, P, to open the trap-door, and by the tilting frontward of the receiving hopper, B, to disengage the spring bar, O, from the vertical rod, R, and allow its descent to close the trap-door, H, as set forth in the specification and shown in the drawings.

WILLIAM BIDDLE.

No. 8124.—*Improvement in Bran Dusters.*

What we claim as our invention, and desire to secure by letters patent, is the combination of the scouring, beating, and distributing brush with

the perforated guard-plate surrounding it, whereby the bran to be dressed is more equally distributed and fed to the bolt than has been done by devices heretofore in use for the purpose.

WILLIAM A. McFARLAN,
THOMAS C. CARPENTER.

No. 8125.—*Improvements in Planing Machines.*

Having thus fully described my improved machine for planing, tonguing and grooving planks, &c., what I claim therein as my invention, and desire to secure by letters patent, is—

First. The jointing or hinging of the plane stock-supporting frame, E, J, *f, f*, or its equivalent, at one end, and giving it an elastic bearing at its opposite end, substantially as herein set forth, whether the said plane stock-supporting frame to be used in connexion with individually vibrating plane stocks, or with other descriptions of plane stocks, or planing-knives, or cutters, for the purpose of reducing or planing planks, or boards, upon their sides or edges.

Second. I claim the combination of the supporting frame, containing the adjustable plane stocks, H, H, with the self-adjusting supporting frame, containing the plane stocks, G, G, by which the inner or under surfaces of the plane stocks, G, G, are made to form a self-adjusting bed, one side of a plank; whilst the knives in the stocks, H, H, are operating upon and facing the opposite side of the same, and by which the inner or under surfaces of the plane stocks, H, H, are made to form an unyielding bed on one side of a plank; whilst the knives in the plane stocks, G, G, are operating upon and reducing its opposite side; and by which a plank can be faced on one side, and reduced and faced upon its opposite side, at simultaneous operations, substantially as herein set forth.

Third. I claim the combination of the supporting frame, containing the self-adjusting plane stocks, G, G, with the arbor of the roller, A, at its forward end, and with the supporting frame, containing the plane stocks, H, H, at its rear end, for the purpose, in the first place, of so guiding the transversely reciprocating movements of the said plane stock supporting-frames as to keep the inner sides of the respective series of plane stocks contained therein, parallel with each other, and parallel with the surfaces of the pairs of rollers, A, A', and B, B'; and in the second place, for the purpose of enabling the supporting frame, containing the self-adjusting plane stocks, G, G, to be detached from the supporting frame containing the adjustable plane stocks, H, H, and be swung outwards upon the shaft of the roller, A, to afford free access to the inner sides of the plane stocks in both the said plane stock supporting frames, substantially as herein set forth.

Fourth. I claim the combination of the rollers, *d, d*, with the plane stocks, G, G, when they are so arranged that the roller in one plane stock will form a rotating and self-adjusting mouth-piece to the planing knife that succeeds it, and at the same time form a bed on one side of a plank for a planing knife, acting upon its opposite sides, substantially as herein set forth.

Fifth. I claim the giving to straight-edged planing or reducing knives, or cutters, that are arranged athwart the surfaces of the boards or planks

operated upon, a transversely reciprocating movement, whilst a continuous longitudinal movement is imparted to the said boards or planks.

Sixth. I claim the manner of producing a uniform elastic pressure upon the upper and lower bearing boxes of the arbors of the pressure rollers, A, B, C, viz: by means of pairs of screws, k, k' , arranged as herein described, and having threads inclining at angles of about thirty degrees with their axes, which are banded together, and operated upon by a weight, (N,) substantially as herein set forth.

Seventh. I claim the within-described improved stock, that receives the tonguing cutters, v, v and r, r , composed of the central governing plate, S, combined with the projections, o, o , on the side plate, Q, and the projections, o'', o'' , on the side plate, R, substantially as herein set forth.

Eighth. I also claim the manner of combining the stationary cutters, v, v , with the governing centre plate, S, by means of the inclined projections, o, o'' , on the sides of the said plate, the flaring notches in the plate, and the gibs, p, p , having lugs at each extremity, placed in the said flaring notches, and acting upon the edges and front sides of the said cutters, v, v , substantially as herein set forth.

NELSON BARLOW.

No. 8126.—*Improvement in s Breech Loading Fire Arms.*

What I desire to secure by letters patent, and claim as my invention in that class of breech-loading fire-arms in which the barrel is disconnected from the breech, and is pivoted at some point intermediate between its but and its muzzle to the stock, is a lever beneath the stock, by means of which the barrel is turned upon its pivot, to raise and to depress its but, and is locked to its breech when the but is depressed, and is unlocked therefrom to allow the but to be raised, the several members of the implements being arranged and operating substantially as herein set forth.

In combination with the above-claimed device, I claim a piston breech pin, which, by the movements of the lever to depress the but of the barrel, and to lock it in place, is made to move the cartridge forward in the barrel and to close the but thereof, and which, by the movement of the lever, to unlock and raise the barrel, is made to unclose or open the but of the barrel before the latter rises under the action of the lever.

I likewise claim the sliding bolt, I, constructed with slot and hook, or their equivalents, and arranged as herein set forth, in combination with a lever handle, for the purpose of imparting motion to the piston breech-pin from the lever beneath.

EDWARD MAYNARD.

No. 8127.—*Improvement in Boot Crimps.*

Having thus fully described our invention, what we claim therein as new, and desire to secure by letters patent, is the combination of the spring frame, B, crimping plates, C, and boot tree, D, with the adjustable side springs, F, F', for the purpose of crimping boot fronts, and adjusting the pressure of the crimping plates to the particular point in

which the creases have a tendency to run; the whole being arranged in the manner herein described and represented, or in any other manner essentially the same.

NATHAN DAWES,
HIGGINS HARRISON.

No. 8128.—*Improved Self-adjusting and Locking Switch for Railroads.*

Having thus fully described this form of self-adjusting railroad switch, what I claim as my invention, and desire to secure by letters patent, is the combination of the counterpoise weights, R, R, R, R, or their equivalents, with the toggle levers, D, D, and stops, Q, Q, substantially as described, operating in the manner and for the purpose herein substantially set forth and made known.

JOHN C. PAST.

No. 8129.—*Improvement in Comb Cutting Machines.*

I do not claim the invention of a single chisel, made to operate by successive blows or cuts, each of which is in advance of another, and so as to create a series of cuts through a plate of horn or shell, such as will separate such plate into two combs without what is termed a bottoming—that is to say, with the roots of the teeth of each of the said combs in a straight line and not in a curved line, as they are when made with the “bottoming;” nor do I claim a die so made of stationary chisels or cutters, (that is to say, those which are removable with respect to one another,) and for the purpose of enabling a person, by pressure of the whole series of cutters at once, against a plate of horn or shell, to separate it into two combs, either with or without a bottoming; but what I do claim is my improvement in comb cutting machinery, the same consisting in making the cutters to operate or move separately and independently of each other, and in regular succession, in combination with making them of different and the required lengths, so as to produce the separation of two combs from a comb plate, substantially in the manner, and with the bottoming to their teeth, as hereinbefore specified.

HORACE S. COOK.

No. 8130.—*Improvements in Hand Machines for Spinning Wool.*

What I claim as my invention, and desire to secure by letters patent, is the clamp, D, D', the inclined planes, E, E, the lifters, F, F, the adjustable stop, G, the trip, H, the hand and ratchet, L, with the hand and ratchet, K''', M, M', and N, combined and arranged as set forth and described, or any analogous device for the purpose of spinning wool.

MARGARET HULINGS.

No. 8131.—*Improved arrangement of Machinery for Actuating the Crank Indicator.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of bevel wheels, c, f, g, e, and their shafts, F, I, H, herein represented and described; the first, c, in the series being actuated

by a motion derived from the eccentric by means of a crank, *a*, and pin, *b*, and the last, *e*, giving motion to the indicator hand; the whole being constructed in the manner and for the purposes herein set forth.

SAMUEL B. HUTCHINS.

No. 8132.—*Improvement in Seed-distributors of Seed planters.*

Having thus described our improvements on the machine for planting corn and other grain, what we claim therein as new, and desire to secure by letters patent, is in combination with the notched transverse bar, *X*, the employment of the jointed clearers, (*n*,) projecting from the recesses of said bar, *X*, into the apertures (*a*) of slide bars, *T*, for preventing the choaking of the apertures.

DAVID WOLF,
HERMAN WOLF.

No. 8133.—*Improvement in Collars for Harness.*

I do not claim generally the hame in one piece with pads of limited length, but what I do claim as my invention, and desire to secure by letters patent, is the U-shaped metallic breast plate, *B*, suitably padded and made to fit around the neck of the horse, the same being so limited in length as not to reach the shoulder blades of the animal, and being suspended from the neck by a neck strap.

JOSEPH W. BRIGGS.

No. 8134.—*Improvement in Processes for treating Vegetable Fibre.*

What I claim as my invention and discovery, and desire to secure by letters patent of the United States, is—

Firstly. The preparation of vegetable fibre capable of being spun or felted by submitting the plant from which the fibre is to be derived to the action of caustic, soda, or other solutions of like properties, and then to that of sulphuric or sulphurous acid, in the manner set forth, whereby the gummy, glutinous, and other matters which connect the fibre with the woody portion of the plant, are dissolved and discharged, and at the same time effecting the discharge of the oleaginous and other coloring matters contained within the woody portions, or "straw," without straining the "fibre," as more fully described herein.

Secondly. I claim splitting the fibres of vegetable matter in preparing them for spinning, by the generation and liberation of carbonic acid or other gas within the cellular portions of said fibres, in the manner described, or in any other manner by which gas may be generated and liberated for the purpose set forth.

P. CLAUSSEN.

No. 8135.—*Improved Sash Stopper.*

What I claim as my invention, and desire to secure by letters patent, is arranging a sash stopper, composed of a friction plate, bolt, and helical spring, with the friction plate parallel to the side of the sash, and the bolt rising obliquely upward therefrom, in the manner herein set forth, so

that the upward motion of the sash will relieve the same from the frictional resistance of the friction plate by counteracting the force of said spring, and that the downward motion or tendency of the sash will augment the frictional resistance of said friction plate by aiding the force of said spring.

JOSEPH OSBORN.

No. 8136.—*Improvement in Horse Powers.*

What I claim as my invention, and desire to secure by letters patent, is, first, the employment of rollers, G, G, mounted or hung on the main shaft, B, and lower guide shaft, F, in combination with the flanches on the wheels, k, to retain said wheels upon their axles when passing from one platform to the other, and to check their revolution, as described.

CYRUS AVERY.

No. 8137.—*Improvement in machines for expressing Cane Juice.*

What I claim as of my own invention, and desire to secure by letters patent of the United States, is—

Firstly. The extraction of the juice from cane by submitting the stalks of the same in perforated tubes, or other vessels constructed on the principle described herein, to a continuous pressure in the manner set forth, whereby time is afforded for the juice to flow from the cellular tissues, and reabsorption into the exhausted cane is avoided.

Secondly. The perforated compressing tubes, having either a straight or a tapering bore.

Thirdly. The combination of the pistons with the perforated tubes and hoppers, whereby the operations of regulating the feed, cutting the canes into equal lengths, pressing and discharging the same, are effected substantially as herein set forth.

HENRY BESSEMER.

No. 8138.—*Improvement in the gearing of a Seed Planter.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the double bolt, h, with its slotted arm, k, rock shaft, n, with its arms, m and p, and pitman, g, for the double purpose of giving motion to the feeding apparatus, and also regulating the quantity of seed to be sown, when said pitman is operated by a long crank, upon which it travels, as herein fully shown and represented.

MARSHALL J. HUNT.

No. 8139.—*Improvement in Revolving Frames for drying Fruits and other articles.*

What I claim as my invention, and desire to secure by letters patent in the above described portable frame, is the centre, E, with three or more arms, to support a cord, netting, or cloths for the purpose of exposing,

cloths, clothes, glue, fruits, seeds, &c., with facility to be dried, so constructed that the arms may be raised up and brought together, to expedite the collection of the articles dried, and so that it may be conveniently removed when not in use, substantially as described.

I do not intend to limit my invention to the precise form of construction described, but to vary it to suit the circumstances in which it is to be used, while I accomplish the desired object by means substantially the same.

J. C. DICKEY.

No. 8140.—*Improvement in Ornamenting Baked Earthenwares.*

I do not intend herein to claim the general application of oil-painting to china or earthenware; but what I do claim as my invention, and desire to secure by letters patent, is—

First. The application of coloring water mixed with varnish, or its equivalent, to the surface of baked earthenwares, for the purpose of giving to such ware a surface of sufficient body, and of sufficient brilliancy, for ornamental purposes; thus obviating the necessity of the glazing process, substantially as herein described.

Second. The inlaying of pearls, gems, &c., on china and baked earthenware, for ornamental purposes, substantially as herein above described.

Third. The peculiar cement and process by which I affix pearls and gems to the china or baked earthenware.

RALPH B. BEECH.

No. 8141.—*Improvement in Carving Machines.*

What I claim as my invention, and desire to secure by letters patent, is the use of the pendant lever, suspended from a ball and socket joint, in combination with a horizontal table for the pattern and block; the said table being affixed to the end of the pendant-lever by a ball and socket joint; the whole being arranged with respect to the tracer and cutter, substantially in the manner, and for the purpose described.

I also claim preventing the pendant lever from changing its centre of motion, or from rotating on its own axis, or on any line passing through the centre of its motion, by the use of the bent arms, working in balls in spherical sockets, substantially as described.

I also claim combining with the pendant lever two or more tables, substantially in the manner described, or in any other, substantially the same, and arranged each with a tracer and cutter, respectively, in order that large carvings may be obtained from a small pattern, or *vice versa*, or both at the same time, and with the same machine, substantially as described.

LEWIS S. CHICHESTER.

No. 8142.—*Balanced Rudder.*

What I claim as my invention, and desire to secure by letters patent, is the employment, for the purpose of steering ships and other vessels in water, of two rudders, hung upon, and at equal distances from, the same

centre of motion, and with their surfaces parallel, or nearly so, with each other, in such a manner that the same resistance is offered to each by the vessel's motion through the water, and both are balanced, substantially as herein described.

C. F. BROWN.

No. 8143.—*Improvement in Churns.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the arms, H, H, with their rollers, I, I, which are controlled by the crank and the swinging arms, G, G, with their floats, g, g, kept in proper place, both in churning and gathering, and working the butter by the resistance of the cream, as herein described and shown, and for the purposes herein represented.

DAVIS DUTCHER.

No. 8144.—*Improvement in Comb-cutting Machines.*

I do not claim the mere use in a die of a clearer for forcing out of the die the articles produced thereby; but what I do claim as my invention is the combination of the two series of lifters and bent levers, n, (arranged upon the travelling carriage, A,) with the pressure roller, in such manner that the continued motion of the carriage shall operate the lifters after the combs are cut, substantially as hereinbefore described.

THOMAS W. HILL.

No. 8145.—*Improvements in Permutation Safety Locks.*

What I claim as new, and of my own invention and improvement, and desire to secure by letters patent of the United States, is—

First. The application of the lever, b, 5, and dog, b, 6, with the tusk, 40, to be acted on by the talon, 39, and allow the spring, 38, to throw the tusk, 40, into the notches on the lower part of the followers, and auxiliary followers, so as to prevent any motion of these parts, if any of the tumblers are lifted, after any end-shake motion has been given to the bolt, by any improper attempt to unlock it.

Second. The combination of the tumblers, a, slides, b, 1, and followers, a, 9, through the tenons, 18, notches, 30, tongues, 29, and jaws, 24, to lift the slides, b, 1, and followers, a, 9, to the same extent as the tumblers, a, are lifted by the key sections on locking the bolt; and to sustain the slides, b, 1, until the tusk, 33, takes the notches, 31, on the slides, and holds them, so that the bolt cannot be retracted until all the tumblers, a, are lifted to meet the notches, 30, and allows the springs, 25, levers, a, 0, and auxiliary followers, a, 8, to lift and place the followers, a, 9, in the same positions as when the bolt was projected, substantially as described and shown.

Third. The mode, described and shown, of so arranging and combining the cylinder, c, 4, by the flanches, c, 5, angles, 60, tumblers, c and a, and pins, 47 and 49, with the detector-lever, D, at the part, c, 1, so that no one of the tumblers, a, can be separately lifted without placing the part, c, 3, of the detector-lever over the key-hole, with the edges of

the notch, 55, covering the open space around the drill pin, 57, by which arrangement no movement of the cylinder, *c*, 4, can be made without producing the same effect; so that if powder is introduced into the cylinder, *c*, 4, and the cylinder is moved with the intent of entering a blow-pipe to spread the powder on either side of the cylinder, the part, *e*, 3, and notch, 55, instantly cover the key-hole, and prevent the entry of the blow-pipe for such a purpose; these parts being constructed, arranged, and operating substantially as described and shown.

Fourth. The combination of the cylinder, *c*, 4, block, 62, and hole, 63, to receive and pass out any gunpowder put in for the purpose of exploding, to destroy the lock, and, at the same time, prevent the powder from reaching any other part of the interior of the lock.

Fifth. The application of the safety-valve block, 64, to vent the explosion of any gunpowder that may be confined in the cylinder, *c*, 4, by plugging both the key-hole and the hole, 63.

Sixth. The mode of fitting the key-hole cover, *c*, 3, with the notch, 55, on the detector-lever, *D*, to match the neck, 56, on the key-shank; such means also preventing the introduction of any pick, or false instrument, after any movement has been given to the cylinder, *c*, 4, by the notch, 55, being as small as the drill pin, 57.

Seventh. The application of the guard piece, 65, on the detector-lever, *D*, to prevent a pick reaching the pin, 45, of the detent dog, *b*, 8.

Eighth. The application of the cam-pointed piece, *c*, 6, on the detector-lever, *D*, to move the pin, 47, and detent dog, *b*, 8, so attached that if the key-hole cover is cut or drilled off the piece, *c*, 6, falls away, and leaves the detent dog, *b*, 8, still holding the bolt.

ROBERT NEWELL.

No. 8146.—*Improvement in Churns.*

Now, what I claim as my invention, and desire to secure by letters patent, is the combination of the rock shaft, levers, connecting rod, and swing, for the churn, for the purpose of producing the perpendicular movement of the dasher, substantially in the manner herein described, to be denominated "the oscillating perpendicular dash churn."

J. S. RICHARDSON.

No. 8147.—*Improvement in crossing the fibres in forming the bats for Felt Cloth, &c.*

What I claim as new in my invention, and desire to secure by letters patent, is—

First. The employment, for the purpose of carrying webs, sheets, or layers of any fibrous material, of an apron, *B*, *B*, of material pervious to air, having a box, *E*, in which a vacuum is produced, placed at the back, the side of the box next the apron being perforated, or otherwise rendered pervious, so that the external air, rushing through the apron to fill the vacuum within the box, forces the material close to the apron, and confines it there, in combination with the manner herein described of throwing off or releasing the material from the apron by suddenly closing the valve, *S*, in the pipe, *G*, communicating between the box, *E*, and the apparatus for producing the vacuum, and at the same time open-

ing the valve, *l*, in the said pipe, to admit air into the box, or by any means substantially the same.

Second. The flap, *t*, operating in the manner and for the purposes substantially as herein specified.

ALONZO C. ARNOLD.

No. 8148.—*Improvement in Governors.*

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as herein specified, of steadying the movement of governors or regulators of motion, by apparatus herein described, or the equivalent thereof.

GEORGE H. CORLISS.

No. 8149.—*Improvements in Railings.*

What I claim as my invention, and desire to secure by letters patent, is making the dove-tailed tenons, whether to the paling or top and bottom rails, wedge-shaped in the length of the railing, the taper at the opposite ends being reverse, and making the grooves in the rails or palings in the same manner, that the palings cannot slide in either direction, binding the whole firmly together, substantially in the manner described.

SOMMERS CROWELL.

No. 8150.—*Improvement in Machines for Facing and Polishing Stone and other Substances.*

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as herein described, of grinding, facing, or polishing the surface of stones, and other substances, by means of a grinder, rubber, or polisher, connected and combined with a spindle, from which it derives a rotary motion by means of universal and sliding joints, substantially as described, that the said grinder, rubber, or polisher may be carried over any and all parts of the surface, to be worked whilst its surface is self-adapting, as described.

ALBERT EAMES.

No. 8151.—*Improvement in Governors.*

What I claim as my invention, and desire to secure by letters patent, is the employment of a loose wheel or pulley, *A*, propelled by the prime mover, and driving its shaft, *B*, through the action of a separate elastic force, weight, or pressure, such as procured by the spring, *H*, in combination with the several racks and pinions, or their equivalents, as described, for operating the adjusting or regulating slide, *J*, substantially in the manner shown and specified, and for the purposes set forth.

WILLIAM GARDNER.

No. 8152.—*Improvement in Carriage Springs.*

Having thus fully described my improvements in buggies, &c., what I claim as my invention, and desire to secure by letters patent, is the

connecting of the axles of wheeled vehicles by means of curved spring perches, which are combined with the supporting springs of the vehicle, that have a greater degree of curvature than themselves, substantially in the manner and for the purposes as herein set forth.

CHAUNCEY H. GUARD.

No. 8153.—*Improvement in Washing Machines.*

What I claim as my invention, and desire to secure by letters patent, is the triple and concentrated action of pressure blocks upon the clothes, being constructed and operated substantially in the manner herein set forth and described.

JOHN O'NEIL.

No. 8154.—*Improvement in Lanterns.*

What we claim as our invention, and desire to secure by letters patent, is the mode of attaching the lamp to the lantern by means of the springs and flanges, as herein substantially set forth.

HUGH SANGSTER,
JAMES SANGSTER.

No. 8155.—*Improvements in the method of finishing the Heads of Screws.*

I have herein described the construction and arrangement of machinery which I have essayed with success; but I do not wish to limit myself to the specified construction and arrangement, as these may be modified without changing the principle of my invention.

What I claim as my invention, and desire to secure by letters patent, in the method, herein described, of finishing the heads in the manufacture of wood screws, is partly shaving the head with a cutter before nicking, and after nicking subjecting it to a second shaving operation, to complete the shaving by means of a cutter, whose edges form with each other a more acute angle than the edges of the cutter first employed, as herein specified.

THOMAS J. SLOAN.

No. 8156.—*Improvement in Centrifugal Sugar Drainers.*

What I claim as my invention, for which I desire to secure letters patent, is the contrivance for discharging, and at the same time cleansing, the strainer whilst in motion, by means of an elevator rising in a spiral groove, substantially as described, or by an elevator rising in vertical or inclined grooves, which is essentially the same.

WILLIAM VAN ANDEN.

No. 8157.—*Improvement in Grain Harvesters.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is gearing the operating parts of the machine from both the wheels, in combination with the arrange-

ment by which portions may be driven by either, so as to equalize the driving power upon each, and thus to allow the machine to be much more easily guided and controlled.

N. T. ALLEN.

No. 8158.—*Improvement in Brick Machines.*

Having thus described my improvements in the machine for making bricks, what I claim, and desire to secure by letters patent, is the rotating mould wheel, A, G, H, I, *e*, constructed, as herein described, with a series of moulds in its periphery and an annular plane, A, outside of the moulds, and furnished with pistons, J, arranged, as herein described, for the purpose of discharging the bricks from the moulds, as set forth.

I also claim the mode, herein described, of changing the positions of the pistons, J, by means of the bar, (*m*,) (attached to the horizontal presser,) with its block (*o*) and plate, (*u*,) which are made to impinge upon the vertical plates, (*n*,) which are attached to the pistons for that purpose.

I also claim the combination of the hopper, L, horizontal presser, P, vertical presser, V, and hook rod, (*w*,) with the traverse horizontal lever, Y, and with the mould wheel; the whole being constructed and arranged in the manner and for the purposes herein described.

MAHLON GREGG.

No. 8159.—*Improvement in the construction of Dies.*

I do not claim to be the first to construct a die with a lined surface, to deaden the metallic surface operated on; but what I do claim as new, and of my own invention, and desire to secure by letters patent of the United States, is the application of a die with a lined or corrugated surface, with the figure or pattern cut out counter sunk, so that the lined surface deadens the plate of polished metal, and leaves the polished surface of the figure untouched, for producing ornamental designs on polished metallic surfaces.

HIRAM W. HAYDEN.

No. 8160.—*Improvement in Cooking Stoves.*

Having thus described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, are the cold air passages, substantially as here arranged, to wit: having each an external aperture near their upper part on each side, beneath which projects a plate, (*f*,) which carries the air to the centre of the stove, whence, by a second plate, (*g*,) beneath the middle of the passage, it is again deflected to the outer ends of the passage, (thus counter-balancing the cooling effects at its entrance,) whence it is distributed in hot blasts to the fire.

ELIAS YOUNG.

No. 8161.—*Improvement in Wash Boards.*

What I claim, and desire to secure by letters patent, is—

First. I claim fastening cloth, or its equivalent, on the board to prevent fabrics from slipping and from being torn or rubbed too much; but I do

not claim lining the grooved wash board with India rubber, or other equivalent material.

Second. I claim hinging the wash board, A, to the frame, B, C, for the purpose of holding the clothes while being washed, and, at the same time, allowing the board to be turned over, substantially as herein set forth.

WILLIAM T. BARNES.

No. 8162.—*Improvement in Augers.*

What I claim as my invention, and which I desire to secure by letters patent, is the form of the lips, or cutting edges, of boring implements, as illustrated in figures 1, 2, and 4—that is, such lip commencing at the screw or centre point, and running nearly at right angles thereto, until, about half way from the centre to the outer part of the boring implement when it assumes a curve upward, or toward the handle-end of the instrument, which curve is continued until it is nearly semi-circular, or until it turns within the periphery of the auger, or bitt, as shown in fig. 1, the curved edges being also under-cut or back-sloped, as illustrated in figs. 2 and 4, between A and B, but without being confined to any particular angle of such back-sloping or under-cutting; all as hereinbefore set forth.

RANSOM COOK.

No. 8163.—*Improvements in Knitting Machines.*

What I claim as my improvement is the arrangement of the needles in the plane of the endless belt, instead of at right angles to it, in combination with the arrangement of the driving pinion, *b*, and the projecting joints, *x, x, x*, &c., of the links of the belt, on the outside of the belt; the belt being supported, and the whole being applied to the stitch hook, yarn guide, and presser, and made to operate together, and with the work hanging on the inside of the belt, substantially as hereinbefore specified.

RUFUS ELLIS.

No. 8164.—*Improved Connexion of Telescopic Masts and Spars.*

What I claim as my invention, and desire to secure by letters patent, is connecting and adjusting the several joints of masts, yards, and all spars constructed for telescopic tubes, or tubes fitting one within another, by means of a screwed rod, C, or screwed rods, C and C', nuts and female screws, F, and set screws, *d*, or their equivalents; the whole being inserted in, and secured or attached to, the tubes, and operating in the manner substantially as herein set forth.

C. F. BROWN.

No. 8165.—*Improvements in Machines for Dressing Shingles.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the head block, *t*, with the springs, *u, u*, cams, *v, v*, the rollers, *o, o*, and stops, *x, x*, for the purpose of passing the shingles between and out from the cutting cylinders, in combination with the ar-

arrangement for depressing the upper cylinder while in motion, for the purpose of giving a taper to the shingle; the whole combined and arranged substantially as set forth in the above specification.

SEYMOUR CARVER.

No. 8166.—*Improvement in Running Gear of Locomotives.*

What I claim as my invention is the combination of the bent levers, (o,) the connecting rods, (P, P',) and tractile bar or spring, or other equivalent contrivance or contrivances, with the main frame, or its housings, and the boxes or pedestals of the journals of the driving wheels, and for the purpose substantially as hereinbefore specified.

GEORGE S. GRIGGS.

No. 8167.—*Improvement in Ventilators.*

Having thus described my improvements in ventilators, I shall state my claim as follows:

What I claim as my invention, and desire to have secured to me by letters patent, is a ventilator, as herein above described, composed of two series or sets of curved slats, arranged one within the other, and running from the edge of the flue, or other orifice, to a small circle, or plate, over the centre of the same, the whole forming a conical or globe-shaped ventilator, the spaces between the several outer slats being protected by the inner slats, leaving spaces or apertures between the two sets of slats, the only openings to said apertures being in an oblique or sideways direction; all as hereinabove described and set forth.

THATCHER C. HATCH.

No. 8168.—*Improvement in Regulators for the Pen Beam in Ruling Machines.*

I do not claim to be the inventor of the flexible hooked regulator attached to the pen-beam, as heretofore constructed, but what I claim as my invention, and desire to secure by letters patent, is—

First. I claim the pieces, G, H, A, B, in combination with the hinge joints, (1, 2, 3,) arranged and combined substantially and for the purpose as herein described.

Second. I claim the sliding piece, B, the bearings, C, C, C, and the finger wheel, F, in combination with the pieces, G, H, A, uniting by hinge joints, or in any other manner substantially the same, using in the construction of the whole machine any material adapted to the purpose of forming, as herein described, a pen beam regulator for ruling machines.

W. O. HICKOK.

No. 8169.—*Improvements in Revolving Boilers.*

Having thus fully described my invention, I will proceed to state what I claim as new, and desire to secure by letters patent. I claim lining the inside of that part of a revolving boiler which comes in con-

tact with the fire or heat with wire gauze or cloth, or any perforated or pervious metal work, I, in the manner and for the purpose substantially as herein described.

CHARLES ANDERSON.

No. 8170.—*Improvement in Ploughs.*

What is claimed as the invention of Benjamin Giger, and as not previously known, is the peculiar form and construction of the standard, with its sockets at the upper extremity, and flanges at the lower, and the method of uniting them so as to form a double machine, capable, also, of being used for cultivation in its separate parts, as set forth.

The whole machine, as above described, constitutes "Giger's Corn Planter."

JOHN COOPER,

Administrator of the estate of Benjamin Giger, deceased.

No. 8171.—*Self-acting Guard Frog.*

What I claim as my invention, and wish to secure by letters patent, is the combination of the rising and falling guards, f' , f ,² with the levers, e , e , and h' , h ,² by means of an arrangement of levers, connecting rods, &c., substantially such as herein specified, and acting in the manner and to produce the results herein set forth.

CHARLES A. POSTLEY.

No. 8172.—*Improvements in Knitting Machines.*

What I claim as my invention, and desire to secure by letters patent—

First. Is a sinker, to be used in machines for knitting, so constructed as to form the loops upon the needles used in knitting two separate fabrics at the same time and at one operation, and of sufficient weight to draw the requisite quantity of yarn from the supply to form the loops required.

Second. Is a slur, to be used in knitting machines, so constructed as to let each sinker drop to the falling bar, and draw the requisite quantity of yarn from the supply to form the loop, or loops, between the needles, before it allows the succeeding sinker to drop, and act upon the yarn.

Third. Is a falling bar, so constructed that the slurs and slur boxes traverse upon it, instead of traversing a separate bar.

Fourth. Is the combination of the sinkers, stop bars, combs, and needles that traverse, so arranged as to knit two separate fabrics at the same time with one and the same set of sinkers and slur.

Fifth. I do not intend to limit myself to the precise construction described in the foregoing specifications, but to use such forms of construction as will answer the purpose intended.

JOHN PEPPER.

No. 8173.—*Machinery for making Wrought Iron Car Wheels.*

I claim the machinery and apparatus set forth and described in figures 1, 2, 3, 4, 5, 6, to wit, the mould blocks or welders, the hammer, or ram,

with the wedges thereto attached, and the mandrel, in combination with each other, for the purpose of making wrought-iron sheets, substantially as set forth in this specification.

MARIA VAUGHN.

No. 8174.—*Improvement in Machines for splitting Horn and Shell.*

What I claim as my invention or improvement is the cylindrical rotary bed, or drum, A, in combination with the water cistern, or trough, and its furnace and machinery over the drum for bearing the shell or material down upon it during its revolution, as specified, the said drum being provided with a roughened or friction-curved surface, such as will adhere to the shell, and cause it to move with it, and against the knife, as described.

JABEZ ROBINS.

No. 8175.—*Improvement in printing Names of Subscribers upon newspapers, &c.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement and construction of a machine for printing names of persons or places on newspapers and other papers after the manner substantially as described, viz: of a form containing the column of names to be printed, set up in types, and being brought under the action of a stamp by means of a slide, moving by degrees, together with the application of a slitted plate, allowing the paper (to be printed) to be pressed down on the line right beneath the slit of the plate, and shielding the paper from the lines adjoining that under action of the stamp, as hereinbefore described.

HENRY MOESER.

No. 8176.—*Improvement in Lubricating Compounds.*

Having thus described the mode in which my anti-attribution is compounded and used, what I claim therein as new, and desire to secure by letters patent, is the combination of ingredients herein described, whether the proportions be the same as herein set forth, or varied to any extent that the same may admit of without changing the peculiar character of the compound as a lubricator.

J. SELGRATH.

No. 8177.—*Improvement in Cars for Transportation of Coal.*

Having thus fully described my invention, I wish it to be distinctly understood that I do not claim the use of cylinders for conveying material upon common roads, as this has been done heretofore; but what I do claim as of my invention, and desire to secure by letters patent, is the combination of a partition or partitions with a metallic cylinder or cylinders provided with flanged rims, as herein described, for the purpose of carrying material in bulk on rail or other roads where high velocities are attained, said material being held in place by centrifugal force whilst in motion, and prevented from falling or rolling in the cylin-

der by the partition or partitions whilst in the act of stopping or starting, as herein fully described and shown, or by any other means essentially the same.

LAURENCE MYERS.

No. 8178.—*Improvement in Machinery for Cutting Ratan, &c.*

What I claim as my invention, and desire to secure by letters patent, is—

First. I claim the combination of the cutters, *a*, as described, with the levers, *C*, and springs, *e*, and cams, *D*, or their equivalents, and also handles, *D'*, and links, *d'*, for the purpose of applying said cutters or scrapers, so as to act upon the stick of ratan, in the manner herein described, and by which they may all be operated simultaneously, substantially in the manner herein described.

Second. In the process of cutting cane or ratan into strands, as described, I claim beading the stick at the point at which the cutter is removing the strand from the surface.

Third. I claim the combination of the elements which compose each simple section of the cutting apparatus; that is to say, of the cutter, *H*, and gauge, *I*, with the stock, *G*, and guide, *g*, and bed roller, *F*, or their equivalents, substantially as described, for the purpose of bending the stick and removing the strand therefrom, whether said section is used alone or is combined with others as described.

Fourth. I claim the combination of that part of the machine called the "scraper" with the feeding rollers, or their equivalents, and the several sections of the cutting apparatus, said sections being so arranged in relation to each other as that the stick, in passing from one to the other, shall be properly bent; and also that the several cutters shall act upon different points of its circumference; the whole being arranged and operating substantially in the manner herein described and set forth.

SYLVANUS SAWYER.

No. 8179.—*Improvement in Machines for finishing the backs of Books.*

I do not claim to be the inventor of "backing books" by means of a roller, as rollers having concave peripheries have been used, which were passed longitudinally over the back; nor do I claim the construction of the clamps or jaws between which the book is held; nor do I claim to have invented the use of circular engraved tools or rollers for embossing books; but what I do claim is—

First. The use, for the purpose described, of a roller, *G*, of the whole length or part of the length of the back of the book, either plain for a plain back book, or grooved for a raised banded book, or having a figure or figures cut or engraved, or otherwise made upon it, rolling over the back of the book from side to side, or from the centre to the sides, and having a yielding pressure applied to it by weighted levers, or their equivalents, in the manner substantially as described.

Second. I claim clamping or holding the book in a swinging book-holder, *E*, *E*, or its equivalent, which hangs on pivots or journals, *o*, *o*, and is capable of being swung back and forth so as to cause the back of the book held in it to describe an arc of a circle, and bring each part of

the back to the roller, so that it shall receive an equal pressure all over its surface, substantially as and for the purpose herein set forth.

Third. The gauges, *v, v*, sliding upon an inclined bar or bars, *w, w*, that they may be set to form guides for placing both ends of the back of the book at an equal or nearly equal elevation in the clamp, so as to cause each part to receive a uniform pressure, and may be drawn back from the book without dragging or rubbing the surface of the back, in the manner substantially as herein shown.

CHARLES STARR.

No. 8180.—*Improvement in making Gutta Percha Hollow Ware.*

What I claim as my invention, and desire to secure by letters patent, in the process above described, is the method, as described, of moulding articles of gutta percha, or the compounds of gutta percha with other substances, by first making the same in the form of a pipe, and whilst in a partially heated and plastic state, giving to it the form required in a mould, by forcing a liquid inside to expand the gutta percha, as described.

S. T. ARMSTRONG.

No. 8181.—*Improvement in Fastening Pedestals to Columns.*

Therefore, what we claim as new, and of our own invention, is the application of the piece, *c*, and different shaped lugs, 8 and 9, on the end of the column to enter the hole, 2, and notches, 3 and 4, so that, on turning the column, the lugs, 8 and 9, take the inclined seats, 5 and 6, to attach the column to the pedestal, in combination with the locking piece, *d*, to prevent the column turning, substantially as described and shown.

WM. LEWIS,
W. H. LEWIS.

No. 8182.—*Improvement in Grain Harvesters.*

Having thus described my improved grain and grass cutter, what I claim as my invention, and desire to secure by letters patent, is—

First. The standard to which the steering wheel is attached, constructed as herein described, so as to perform its own office proper, and also to adjust the cutter at the required height above the surface of the ground.

Second. The discharging rake, which is moved, as described, in combination with the endless apron, for collecting and discharging the cut grain, as set forth.

WILLIAM H. START.

No. 8183.—*Improvement in Mashing Tubs.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The employment of buckets, formed by the revolving arms, *g, g*, working within the hopper, *H*, for delivering the grain, through suitable openings, *d, e*, into, and operating in combination with, the mashing

cylinder, A, A, having an outlet, C, (or outlets,) for supplying the cooler, J, J, substantially as shown and described.

Second. The use of a mashing cylinder, A, A, having beaters within it, and operating in combination with a cooler, J, J, carrying any number of barrels, or shafts, L, L, fitted with projecting pins, *m, m, m, m*, essentially as shown and described for the purposes set forth.

JOSEPH WRIGHT.

No. 8184.—*Improvement in making Hemp from Okra.*

What I claim as my invention, and desire to secure by letters patent, is the preparing of hemp from the bark of the okra plant, in its green state, and the herein-described method of preparing it for use.

JEAN BLANC.

No. 8185.—*Vise Saw Set.*

What I claim as my invention, and wish to secure by letters patent, is constructing a vise for the purpose of compressing saws to be set or filed, in the following manner, namely: with only one supporting arm to each jaw, hinged at their lower extremities, and having an extra arm on one side of, and parallel, or nearly so, to said supporting arms, to the upper extremity of which is attached an eccentric lever, or its mechanical equivalent, for compressing the two jaws together, constructed substantially as herein described.

WILLIAM HINDS.

No. 8186.—*Arrangement of Catches on the Upper Sash, operated by moving the Lower Sash.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement, herein described, of the catches and window sashes, for the purpose described.

WASHBURN RACE.

No. 8187.—*Improvement in Boxes and Axles for Saving Oil.*

I claim causing the beveled edges of the oil-box to enter the grooves of the axles and rest against their outer shoulders, but not against their inner shoulders—thus at the same time preventing end play and the escape of the oil; the journal bearing being lower than the beveled edges of the oil-box, and sufficiently above the bottom of it to prevent the oil coming from the box to the journal.

BENJAMIN KRAFT.

No. 8188.—*Improvement in Inkstands.*

I do not claim the invention of the elastic diaphragm for inkstands, but I claim my inkstand as a new article of manufacture, in which the following features are for the first time associated, viz: an elastic diaphragm, covered and secured from injury by a metallic cap, and regulated by a screw passing through the cap, and, in combination with the diaphragm, the funnel-stop, *l*, and waste-cap, *n*.

HENRY WHITNEY, JR.

No. 8189.—*Improvement in Iron Fences.*

Having thus fully described the nature of my invention, and the manner of constructing the same, what I claim therein as new, and desire to secure by letters patent, is the manner, herein described, of securing the rails of iron fences by means of sectional or divided posts, having slots therein, which are so arranged that, when in place, they break joint with each other, the slot in one section extending upward, and the slot in the other downward, so closing the slots as to prevent the rails, which have a loop or dead-eye turned on each end for that purpose, from passing through or coming out, as herein fully set forth.

JOHN B. WICKERSHAM.

No. 8190.—*Improvement in Bedsteads.*

What I claim as my invention, and desire to secure by letters patent, is the knuckle joints for holding the rails of the bedstead together, in combination with the rods, G and L, substantially in the manner and for the purpose described; said rods being also employed to support the slats forming the bottom of the bedstead.

HARVEY W. SABIN.

No. 8191.—*Improvement in Spectacle Frames.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the spring, B, and cylinder, C, with the temple bow, A, and the glass frame, the whole being substantially as specified.

JOHN P. PAINE.

No. 8192.—*Improvement in Grain Harvesters.*

What we claim as our invention, and desire to secure by letters patent, is the discharging the cut stalks and heads of grain from the platform, D, by means of the combination of the rake, C, with the lever, B, and the co-operation therewith of the series of teeth, *p, q*, on the face of the wheel, A, and the inclined rail, *d*, rising above the curved guard of the platform, D, substantially in the manner herein set forth.

AARON PALMER,
S. G. WILLIAMS.

No. 8193.—*Improvement in Bread Cutters.*

What we claim as our invention, and desire to secure by letters patent, is the use of a series of knives or cutters, (E,) made in the form of eccentric circles or scrolls, with the cutting edge on the periphery, so as to represent a spiral line or curve (as seen in the drawings) when combined with the bars or ribs (C, C) of the bed piece, which serve to sustain the loaf, and also to guide the knives, and with the fingers or prongs, (D,) which hold the loaf against the knives whilst cutting, and also act as outside guides, when the whole is constructed, arranged, combined, and operating substantially as herein described.

A. E. LAZELL,
DAVENPORT LAZELL.

cylinder, A, A, having an outlet, C, (or outlets,) for supplying the cooler, J, J, substantially as shown and described.

Second. The use of a mashing cylinder, A, A, having beaters within it, and operating in combination with a cooler, J, J, carrying any number of barrels, or shafts, L, L, fitted with projecting pins, *m, m, m, m*, essentially as shown and described for the purposes set forth.

JOSEPH WRIGHT.

No. 8184.—*Improvement in making Hemp from Okra.*

What I claim as my invention, and desire to secure by letters patent, is the preparing of hemp from the bark of the okra plant, in its green state, and the herein-described method of preparing it for use.

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WILLIAM HINDS.

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What I claim as my invention, and desire to secure by letters patent, is the arrangement, herein described, of the catches and window sashes, for the purpose described.

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BENJAMIN KRAFT.

No. 8188.—*Improvement in Inkstands.*

I do not claim the invention of the elastic diaphragm for inkstands, but I claim my inkstand as a new article of manufacture, in which the following features are for the first time associated, viz: an elastic diaphragm, covered and secured from injury by a metallic cap, and regulated by a screw passing through the cap, and, in combination with the diaphragm, the funnel-stop, *l*, and waste-cap, *n*.

HENRY WHITNEY, JR.

No. 8189.—*Improvement in Iron Fences.*

Having thus fully described the nature of my invention, and the manner of constructing the same, what I claim therein as new, and desire to secure by letters patent, is the manner, herein described, of securing the rails of iron fences by means of sectional or divided posts, having slots therein, which are so arranged that, when in place, they break joint with each other, the slot in one section extending upward, and the slot in the other downward, so closing the slots as to prevent the rails, which have a loop or dead-eye turned on each end for that purpose, from passing through or coming out, as herein fully set forth.

JOHN B. WICKERSHAM.

No. 8190.—*Improvement in Bedsteads.*

What I claim as my invention, and desire to secure by letters patent, is the knuckle joints for holding the rails of the bedstead together, in combination with the rods, G and L, substantially in the manner and for the purpose described; said rods being also employed to support the slats forming the bottom of the bedstead.

HARVEY W. SABIN.

No. 8191.—*Improvement in Spectacle Frames.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the spring, B, and cylinder, C, with the temple bow, A, and the glass frame, the whole being substantially as specified.

JOHN P. PAINE.

No. 8192.—*Improvement in Grain Harvesters.*

What we claim as our invention, and desire to secure by letters patent, is the discharging the cut stalks and heads of grain from the platform, D, by means of the combination of the rake, C, with the lever, B, and the co-operation therewith of the series of teeth, *p, q*, on the face of the wheel, A, and the inclined rail, *d*, rising above the curved guard of the platform, D, substantially in the manner herein set forth.

AARON PALMER,
S. G. WILLIAMS.

No. 8193.—*Improvement in Bread Cutters.*

What we claim as our invention, and desire to secure by letters patent, is the use of a series of knives or cutters, (E,) made in the form of eccentric circles or scrolls, with the cutting edge on the periphery, so as to represent a spiral line or curve (as seen in the drawings) when combined with the bars or ribs (C, C) of the bed piece, which serve to sustain the loaf, and also to guide the knives, and with the fingers or prongs, (D,) which hold the loaf against the knives whilst cutting, and also act as outside guides, when the whole is constructed, arranged, combined, and operating substantially as herein described.

A. E. LAZELL,
DAVENPORT LAZELL.

No. 8194.—*Improvement in Piano Fortes.*

What I claim as my invention, and desire to secure by letters patent, is the spring acting on the valve at D, in combination with the weight of the key, resting on the valve at F, for the purposes substantially as herein described and represented.

MICHAEL MILLER.

No. 8195.—*Improvement in machines for making Hat Bodies.*

Having thus fully described my inventions, and pointed out some of the modes in which I contemplate using them, and having referred to what was previously known in this branch of the arts, in order that my invention may be the better understood, I do hereby declare that I do not claim the combination of a picker and chamber having an aperture for the admission of air, such a combination having long been known and used for opening and cleaning the fibres of furs; nor do I claim the combination of these with a perforated exhausted former, such a combination having been described, and referred to as applicable to forming hats, and other irregular forms, in an application for a patent by T. R. Williams, in 1840, though it was not then claimed as invention; nor do I claim the use of water to harden or to wet the hat body, such use being as old as the felting process, and is indispensably necessary in all hardening and felting processes; nor do I claim the hardening of a hat body on a cone, such a process having been described and patented to Wells, James, & Peck, in 1837, they using a solid cone upon which a web was wound to form the body, and numerous jets of steam were used to harden the same or to wet it as it was wound on the cone, there being no exhaust; and processes for hardening bodies on a perforated cone have also been described—in 1840 by Williams, and by Wells in 1846, they both using outer pressure to hold the fibres, while the cone and fibres are immersed; nor do I claim any of the parts as my invention, except as they are used in new combinations and producing new and important results.

But what I do claim as my invention, and desire to secure by letters patent of the United States, is the exhausting and suspending fan, C, with its casing and aperture, M, constructed, arranged, and operated substantially as and for the purposes hereinbefore particularly described, in combination with the picker, B, chamber, R, perforated exhausted former, E, and exhaust fan, F, arranged substantially as described and shown, by which arrangements and combinations the several parts, or their equivalents, perform their several and combined functions in a better manner, and produce better results, than have been heretofore attained without any chamber trunk, or tunnel, or any other means to control the fibres after being suspended in the air by the fan, or between the fan and perforated exhausted cone or former, substantially as described and shown.

I also claim the combined action of the currents of air and the currents of numerous jets of hot water in the hardening or wetting process, the currents of air performing the triple duty of holding the fibres on the former and of aiding the water to penetrate the hat body, and at the same time to carry the surplus water through the perforations into the

exhaust, thus effectually preventing injury to the hat body from the accumulation of the surplus water—to wash it while the wetting or hardening process is greatly facilitated and the perfection of the work is secured; the whole process being accomplished by the combination of the several parts named, or their equivalents, for producing the currents of air and water with the perforated former over the exhaust, in the manner and for the purposes substantially as herein described and shown.

The effect of these improvements are the production of a machine combining the best means for opening fibrous materials and suspending them in the air surrounding a perforated and exhausted former, and also of a new combination of means for hardening the fibres and completing the process without removing the hat or applying any pressure preparatory to the suspension of the pressure of the air, by which means a great improvement is effected as well in the forming of the hat and in the process of hardening as in the facility of operation; the whole being by combination of machinery heretofore unknown.

DANIEL BARNUM.

No. 8196.—*Improvement in Lathes.*

What I claim as my invention, and desire to secure by letters patent, is controlling the poppet centre, L, so that it releases itself, after the turning is finished, by connecting it with a sliding bar, N, having a weight, W, or its equivalent, attached, and carrying a ratchet, T, which is held by a catch, t, attached to the stationary bed; the said catch having an arm, v, attached, which is struck by part of the cutter head after the cut is finished, and released from the ratchet, substantially as herein shown.

THOMAS R. BAILEY.

No. 8197.—*Improvement in Running-gear of Railroad Carriages.*

Having thus fully explained the general features of the several parts used in my invention, and specifically the novelty and advantages possessed by my improvements, I will proceed to state that I do not claim exclusively the employment of inclined wheels, either with or without flanges, as such have already before been used; but what I claim as my invention, and desire to secure by letters patent, is the employment of wheels in any number of pairs, attached on either side to the truck or frame of railway vehicles, and set at any inclination to the horizon, converging to a point in or below the rail; so that both wheels of any one pair will rest or travel on opposite sides of the upper surface of either one or the same rail, essentially as shown and described.

DANIEL W. EAMES.

No. 8198.—*Improvement in Wire Hooks and Eyes.*

Having thus declared the nature or character of my invention, and specified the forms and manner of application of my improvements on wire hooks and eyes for garments, and their purposes and uses, I do not claim any of the forms of hooks and eyes heretofore made of wire, nor any peculiar difference in what belongs to any of the various

kinds of them, except in the eyelets or loops. What I do claim as my invention, and desire to secure by letters patent, is—

First. The addition of side springs to the common forms of hooks for wire hooks and eyes, substantially in the manner and for the purposes set forth.

Second. I claim the small ridges, or elevations on each side of the beak of the hook, made by binding the wire of the side springs, or by other means equivalent thereto, for the purposes set forth.

Third. I claim the jewsharp form, or partly circular eyelets, extended to form loops, adapted to receive tape, in connexion with the small elevations to keep the tape in its proper place, substantially as set forth.

CHARLES ATWOOD.

No. 8199.—*Improvements in Machinery for Cutting Files.*

What I claim as my invention, and desire to secure by letters patent, is connecting the file blank to be cut with a bed, which has a positive feed motion, substantially as described, in combination with an incidental rolling motion, depending upon the shape of the blank, and the angle which the cutter forms therewith, substantially as described.

I also claim connecting the chisel with its stock by a joint, as described, in combination with a rolling bed, as described, by which they are rendered self-adapting, as described.

I also claim holding the file down on to the bed during the operation of cutting, and near to the cutter, by means of a roller, or its equivalent, combined with the rolling bed, substantially as herein described; but this I only claim when the end of the file is so connected with its bed, that it shall be free to move up and down, that the pressure of the roller may keep that part of the file that is being cut firmly down on to the bed, as herein specified.

I am aware that before the date of my invention the cutter of file-cutting machines has been jointed to a helve or bar, but in such cases it has not been combined with a rolling bed; and, therefore, I do not wish to be understood as claiming broadly the making of the cutter with a joint; but to claim this only under the limitations pointed out above.

I am also aware that the file blank has been made to slide during the feeding motion over a rolling-bed to adapt the transverse plane of the file blank to the line of the cutting edge, for cutting the different ranges of teeth; and, therefore, I do not wish to be understood as claiming broadly the employment of a rolling-bed; but to claim such rolling bed, when made to move with the file during the feed motion, from end to end, under the limitations above specified.

JOHN CRUM.

No. 8200.—*Improvement in Handles of Brushes and Brooms.*

Having thus described my improvements, what I claim as new therein, is the lever jaws, held together by the head-piece of the screw, (g,) in combination with the conical end of the handle, substantially in the manner and for the purpose set forth.

LUKE F. CAVANAUGH.

No. 8201.—*Improved arrangement of the Steam Engine.*

What I claim as my invention, and desire to secure by letters patent, is the method, herein described, of connecting the steam piston of a steam engine with the crank thereof by means of a piston rod, fixed cross head, side bars forked, connecting rod, and belts, or the equivalent thereof, the several devices being arranged and operating substantially as herein set forth, in such manner that the cross piece of the connecting rod, which is placed transversely to the crank-shaft, shall be on opposite side of the axial line of said shaft, at opposite extremities of the stroke of the piston.

I also claim the belts or gimbal rings, or the equivalents thereof, arranged substantially as herein set forth, for the purpose of transmitting the movement of the cross head to the connecting rod of a steam engine.

FR. P. DIMPFL.

No. 8202.—*Improved mode of papering Pins.*

I am aware that by other mechanical devices, such like pin rolls (as represented by figs. 3, 4, and 5) may be coiled or wound up nearly as well, and substantially the same, as by the process herein described, but which do not constitute the novelty nor the substance of this my invention.

What I claim, therefore, as my invention, and desire to secure by letters patent, is the producing of a new manufacture of "pin rolls," either oblong, oval, cylindrical, square, or other shape or form, (so that it combines in effect the common sheeted pin paper, or fillet, stuck or inserted pin paper, or pins wound in closely between the layers, laps, or folds of fillet paper, with the common pin cushion,) whether the centre of the cushion is elevated or plain—that is, whether coned up or level, or whether the pins are inserted through crimps or not, and embraced by the fillet paper—the fillet embracing the shank or barrels of the pins, while the heads of the pins are not so embraced, but open and conveniently accessible to be withdrawn for use without unfolding, unwinding, or disturbing the pin roll, substantially as herein described by the specification and drawings.

C. O. CROSBY.

No. 8203.—*Improved Portable Hydraulic Press.*

What I claim as my invention, and desire to secure by letters patent, is a hydraulic press, quite portable, in which the ram is hollow, and serves as the reservoir to supply the cylinder with water or other liquid, while the force pump and its appendages are contained within the ram, so that, by working this force pump, the ram is forced up until the liquid in such ram is exhausted, and by moving the handle of the pump down it will come in contact with a rod attached to a valve in the pump piston, and the latter comes in contact with a valve in the end of the ram, opening them both and allowing the water to return into the ram again through passages.

RICHARD DUDGEON.

No. 8204.—*Mechanical Hooker-up.*

What I claim as my invention, and desire to secure by letters patent, is in combination with a plate, or the equivalent thereof, for receiving the mass issuing from a rolling mill, the friction drums, the periphery of one of which is shaped substantially as described, and operating substantially as herein set forth, in such manner that by their action the plate, or its equivalent, is quickly raised and held stationary, at the proper height to permit the mass upon it to be passed to the front side of the mill, and is rapidly lowered to the proper position to receive the mass issuing from the rolls.

DAVID J. HAPPERSETT.

No. 8205.—*Improvement in Silk-covered Buttons.*

I do not mean to limit myself to the shape of the mould, nor to the pattern or color formed on the silk covering; neither do I claim to be the first who has used the split shank, plate, and washer, as that has been used with a glass bead for ornamental purposes; but I do not know of any one who has used this plate, shank, and washer as a means for fastening a silk-covered button, and at the same time secure and hide the ends of the silk cover in the hole of the mould, thereby making a durable, finished, and handsome ornamental button.

Therefore, what I claim is the application of the plate, shank, and washer, to a silk covered button, for the purposes specified, and as described and shown.

H. HEINEMANN.

No. 8206.—*Improvement in Machines for Grooving Lumber.*

Having thus fully described our improvements, what we claim to have invented, and desire to secure by letters patent, is the method, herein described, of forming grooves by circular saws and a deflecting throat, in combination with suitable cutters, as set forth.

BIRDSSELL HOLLY,
JOHN W. WHEELER.No. 8207.—*Improvement in Harvesting Machines.*

Having thus fully described the construction and operation of my grain harvester, what I claim therein, and desire to secure by letters patent, is the use of rotating cutters, in connexion with the rotating rake and teeth, (*d*), operating substantially as described.

I also claim the novel manner of gearing the horses, or animal power, under the machine, so as to conduct the grain over them and discharge it in a straight line in the wake of the machine, substantially as herein described and made known.

WM. JONES.

No. 8208.—*Improvement in Cork Cutting Machines.*

I do not confine myself strictly to the precise form of construction herein described, but claim to vary the same as desirable, while I produce the like results by equivalent mechanical means.

What I claim as of my own invention, and desire to secure by letters patent, is the lifting block, (*h*,) susceptible of such adjustment, with reference to the edge of the knife, while the machine is in motion, that, from squares of varying sizes, perfectly formed corks may be cut, of the largest size each square will afford; the whole being constructed and operating substantially in the manner herein set forth.

WILLIAM KING.

No. 8209.—*Improvement in Seeding Machines.*

Having thus fully described the construction, use, and operation of our several improvements on the seeding machine, what we claim therein as new, and desire to secure by letters patent, is—

First. We claim the employment of the oblique, recessed washer, *K*, in combination with the cylindrical cap, *I*, provided with inclined wings or projections, *I*², which match with the oblique recesses, *k*, of the washer, *K*, in such a manner that the pressure produced thereupon shall securely hold the cylindrical cap in the required position when adjusted to increase or diminish the size of the seed receptacles.

Second. We claim scalloping the end of the cylindrical cap, *L*², of the distributing cylinder, and using, in connexion therewith, clamp-screws, (*o*, *o*,) for holding the cylindrical cap in the required position.

Third. We claim the employment of the pin, (*m*²,) fig. 12, or its equivalent, when used in connexion with a clamp screw, *o*⁴, and interior cylindrical cap, *M*², when properly adjusted, to increase or diminish the size of the seed receptacles.

Fourth. We likewise claim providing one of the journal pins, *q*¹, of each depositing tube, *U*, with a cog, *q*², which is made to fit an opening in the the arm, *j*, of the drag bar, *j*², when it shall be turned frontward nearly horizontal, for the purpose of detaching the depositing tube from the drag bar, *j*², with facility, as described and shown in fig. 18.

Fifth. We further claim the employment of the trifurcated holding lever, *L*, in combination with the drag bar, *j*², and suspended depositing tube, *U*, for the purpose of holding the depositing tube in its proper position during the operation of forming the drill and depositing the seed, and by which said trifurcated holding lever, *L*, may be disengaged from the pin, *c*², when an obstruction is visible, and allow the depositing tube to turn rearward when it shall have been struck, and thus save the pin (*C*²) from being broken; and this trifurcated holding lever we claim, or its equivalent.

Sixth. We likewise claim causing the depositing tube to assume its proper position, after it shall have cleared the obstruction, by the action of the long arm (*i*⁴) of the trifurcated holding lever, *L*, upon the cam or projection (*r*) of the depositing tube; and this we claim as in the arrangement herein described and represented.

Seventh. Lastly, we claim so combining a separate, double arm, *P*, with the frontward end of each drag bar, *j*, that it may be detached therefrom, as well as from the eyes or loops, *R*, of the front transverse beam of the frame, as described in the specification, and shown in the drawings at figures 16, 17, and 19.

SAMUEL PENNOCK,
MORTON PENNOCK.

No. 8210.—*Improvement in Revolving Breech Fire Arms.*

Having thus described my self-loading repeating fire arm, what I claim as my invention, and desire to secure by letters patent, is—

First. In combination with a cocking lever, I claim the two triggers, (M, M') arranged and operating in such manner that the tripping of the hammer can be effected either in the ordinary manner, by pulling a trigger, or by the return movement of the cocking lever.

Second. I claim the combination of the sliding bolt (K) with the cap primer, (X,) the two being so arranged that as the hammer is tripped, by pulling the trigger, a cap is applied to one of the nipples of the chambered breech, by which means the chambers are revolved by the back motion of the cock, and capped by its forward motion, the capping by this arrangement being effected in one-half the time in which it can be done by others, heretofore devised.

Third. I claim the construction of the cap and bullet passages, the powder magazine, and the exterior case, in such manner that the bullet and cap passages, and the included powder chamber, can be withdrawn from the exterior case which encloses them, to give free access to every part of said passages, and to facilitate the removal of obstructions therefrom, as described.

Fourth. In combination with a revolving disk breech, I claim a spring powder charger, constructed and operated by the movement of the breech, as herein set forth.

Fifth. In combination with a revolving chambered breach, I claim the stationary cap stripper, constructed and operating as herein set forth.

Sixth. In combination with a revolving breech fire arm, I claim the spring dust-plate, (Z,) which permits the escape of smoke, but prevents the entrance of dirt.

Seventh. I claim the forward inclination of the spout of the bullet passage, in connexion with a turning breech, the two being so arranged that when the latter is turning, the bullet, dropped into the chamber, is pressed against the inclined portion of the spout, and is by it forced down in the chamber of the breech, the inclined surface of the spout thus performing the office of a rammer.

PARRY W. PORTER.

No. 8211.—*Improved Apparatus for Punching Designs in Sheet Metal.*

What I claim as my invention, and desire to secure by letters patent, is the leather bed, or die, in combination with a set of punches, for puncturing purposes, when such set of punches, and the die, are used in connexion with proper rollers, substantially in the manner and for the purposes herein set forth.

WM. T. RUDD.

No. 8212.—*Improvement in Rakes to Harvesting Machines.*

What I claim as my invention, and desire to secure by letters patent, is the rake attached, for raking the grain from the machine without hand labor, constructed and operated substantially as described.

WM. H. SEYMOUR.

No. 8213.—*Improvement in Machines for Pressing Hats.*

What I claim as my invention, and desire to secure by letters patent, is the method of alternately lowering the pressing irons upon the hat block, and raising them therefrom by mechanism, operating substantially as herein described, which is readily controlled by the attendant.

JOHN STEARNS.

No. 8214.—*Improvement in Lifting Jacks.*

What I claim as my invention, and desire to secure by letters patent, is the catch or button, S, operated by the index bar, K, for the purpose of directing the action of the lever, I, J, substantially in the manner herein set forth.

JAMES ST. JOHN.

No. 8215.—*Improvement in Washing Machines.*

I do not claim the constructing or using of a revolving wash barrel, with or without a rolling or tumbling pounder therein; but what I do claim, and desire to secure by letters patent, is the peculiar form of the revolving barrel, with its fluted semi-cylindrical recesses, in combination with a pounding frame, constructed with a weighted hub and three parallel pounders, as herein described.

JOHN BOARDMAN.

No. 8216.—*Improvement in securing Pinions, &c., of Watches in Lathes.*

What I claim as my invention, and desire to secure by letters patent, is the employment of adhesive cement for securing staffs and pinions of watches or time pieces for lathe operation, in combination with a chuck, A, with a sliding tube, B, and a female centre, *a*, as described and set forth, or in any manner substantially the same.

JAMES M. BOTTUM.

No. 8217.—*Improvement in Machines for cutting wood into shreds, and crimping them for Mattress Stuffing, &c.*

I do not claim the combination of fluted cutters with smooth cutters for the purpose of making this article; nor do I claim or use the fluted cutters at all; nor do I cut the wood into round threads, but into flat strips, which are light and more elastic; nor do I claim the arrangement of fluted and smooth cutters in the plane stock; nor the apparatus for holding timber, and feeding it up to the plane, as it has heretofore been used and patented; but what I claim as my invention, and desire to secure by letters patent, is the use of the splitters with the plane iron, and the holder, *i*, and the movable weighted lid, *f*, or anything which is substantially the same, combined and arranged in the plane stock, E, for the purpose of producing the article herein described.

EDWIN K. BROWNING

No. 8218.—*Improvements in Machines for dressing Sisal Hemp, &c.*

What I claim as my invention, and desire to secure by letters patent, is the hinged jaw connected with the driving shaft, substantially as described, in combination with the cylinder to which it is hinged, and provided with a corresponding jaw, substantially as described, whereby the driving power, in carrying around the substances to be dressed, clamps and holds them firmly during the entire operation, as described.

And I also claim, in combination with the cylinder and clamp for presenting and carrying around the substances to be dressed, as described, the knives and combs attached to one or more hinged bars, and provided with the necessary means for operating them, substantially as described.

And I also claim, in combination with the cylinder, as described, the vat of water, in which, at each rotation of the cylinder, the substances to be dressed are immersed, substantially as described, and for the purpose specified.

S. A. CLEMENS.

No. 8219.—*Improvement in Churns.*

What I claim as my invention, and wish to secure by letters patent, is the application of the spring wire, fig. 5, which connects the crank with the dashers, in the manner and form and for the purpose above set forth.

SAMUEL G. DUGDALE.

No. 8220.—*Improvement in Axle Boxes for Journals for Railroad Cars.*

What I claim as my invention or improvement is to support the case, A, on the bearing, B, by projections, *c, c'*, or analogous contrivances applied to its sides, in combination with making the top plate, *a*, of the case and the cap or side plate, *b*, in one piece, separate from the rest of the case, and holding them in place by recesses and projections, or analogous contrivances, substantially as described; the whole being to enable me to entirely dispense with the use of the screws, or screws or nuts, in the construction of a railway car axle box, and thereby avoid not only the injurious consequences which frequently result from their becoming loose, but also the necessity of that care and attention on the part of the carman or attendant so necessary when boxes are used having any of their parts secured by screws.

OLIVER N. FRENCH.

No. 8221.—*Improvement in Carriage Springs.*

What I claim as my invention, and desire to secure by letters patent, is the employment of a semi-elliptical spring, F, G, in combination with a C-spring, H, formed by the extension of one of the arms, G, the combined springs thus produced being set transversely with the axle, and attached thereto, and the body of the vehicle, in the manner substantially as shown and described.

GUSTAVUS L. HAUSSKNECHT.

No. 8222.—*Improvement in Buggy Tops.*

What I claim as my invention, and desire to secure by letters patent, is the mode of connecting carriage tops with the seats by means of bearers, D, and clasp, F, so that they may with facility be removed from one carriage body and applied to another, in the manner substantially as described.

HARMON HIBBARD.

No. 8223.—*Improvement in Fire Proof Safes.*

Having thus described the nature of my invention, what I claim as new, and desire to secure by letters patent, is the combination of wrought and cast iron, the same forming a safe, in the manner and for the purpose substantially the same as described.

LEWIS LILLIE.

No. 8224.—*Improved means for adjusting the effective length of Bridge Counter Braces.*

What I claim as my invention, and desire to secure by letters patent, is the method of lengthening or shortening the counter braces of a girder or bridge truss, so as to produce and maintain any desired, vertical strain or deflection of the girder or truss by means of the counter brace, H, whether all of wood or provided with a metallic end or sheath, the plate of metal, *b*, bearing upon the metallic end or sheath, (or upon the end of the wood when the metallic end or sheath is not used,) at the top of the girder, and the nuts, and the bolts, *e, e*, passing through the clamping pieces, *c, c*, the upper cord and the posts, by which the plate of metal, *d*, is drawn down upon the metallic end or sheath, and the adjustment of the length of the counter brace is effected, substantially as herein described.

D. C. McCALLUM.

No. 8225.—*Improved Rake to Harvesting Machines.*

Having thus described the nature and construction of my harvesting apparatus, what I claim therein as new, and desire to secure by letters patent, is the guide, (*p, q, r, s*), arranged, as described, in connexion with the tilting roller, (*u*), for the guidance of the rake in a path similar to that which it would receive from the human hand, by which it removes periodically the grain or grass from the bed, and frees itself by the retraction of the teeth of the rake endwise.

SYLVANUS MILLER.

No. 8226.—*Improved arrangement of the Flues and Water Spaces of Steam Boilers.*

I do not mean or intend to limit myself to the precise form of construction herein set forth, as it is obvious that, if desirable, the flues (*c*) and (*d*) may be placed vertically, and the others may be horizontal.

What I claim as of my own invention, and which I desire to secure by letters patent of the United States, is the general arrangement of the

tubes and flues of the boiler in the manner described—that is to say, the water tubes, connected with an upper and lower tube sheet, in combination with the flues of less length than the tubes, which flues are also connected with an upper and lower flue sheet, whereby two horizontal flues are formed in such connexion with each other, by means of the vertical flues, that the product of combustion from the fire-place shall pass into the upper horizontal flue, and thence down the vertical flues into the lower horizontal flue, having thus the facility of parting with its heat on the one hand by radiation through the flues to the water spaces surrounding them, and the other through the tubes to the water circulating through those—and this whether the said tubes and flues are placed vertically or horizontally; the whole being constructed and operating substantially as herein set forth.

W. E. MILLIGAN.

No. 8227.—*Improvement in Machines for splitting Leather.*

I do not claim as my invention, in connexion with the upper feed roller, the use of a lower one, such as is usually termed a spring or pressure roller, or one having a hard or practically inelastic surface.

But what I do claim as my improvement in machinery for splitting or dressing wet hides is the employment of an elastic surface roller, (or roller made of gum-elastic, or other like material, placed around an axle, or shaft,) and an inelastic roller, (as feed rollers,) in connexion with the cutting-knife, made either stationary, or, what is better, to have a vibratory or reciprocating motion, all substantially as hereinbefore specified.

WILLIAM PANTON.

No. 8228.—*Improvement in Molasses Gates, or Faucets.*

What I claim as my invention is the arrangement of the spring, which bears the gate against the seat, (said spring being arranged so as to bear against the outer edge, instead of the central part of the gate,) in connexion with making the said gate separate from the lever, and to work on a projection or screw therefrom, essentially as specified.

ERASTUS STEBBINS.

No. 8229.—*Improvement in Revolving Breech Fire Arms.*

What I claim as of my own invention, and desire to secure by letters patent of the United States, is the arrangement for securing the barrel to the stock, viz: the combination of the stud (*c*) with the notch in the back strap (*f*) and with the notch (*d*) and pin, (*i*), as described, the whole being constructed and operating substantially as set forth herein.

JAMES WARNER.

No. 8230.—*Improvement in Machines for sawing and dressing Staves.*

I do not claim the use of a cylindrical saw, *H*, as such has frequently been used; but what I do claim as my invention, and desire to secure by letters patent, is the employment of the saw, *H*, seated loose upon a pulley, *G*, so as to form an eccentric position with the same, as specified,

in combination with the cutters, L, L, the several parts constructed and operating together, for the purposes set forth, substantially as shown and described.

DENNISON WOODCOCK.

No. 8231.—*Improvements in Brick Machines.*

- Having thus fully described the nature and construction of my improvements in brick machines, what I claim therein as new, and desire to secure by letters patent, is the block, or lip, (*d*,) substantially as described, hugging closely the mould wheel immediately behind its point of contact with the pressure roller, in order to prevent any disturbance of the mass after having passed the point of contact.

JOHN J. RIDDLE.

No. 8232.—*Improvement in Combined Fountain and Evaporator.*

Having thus described my invention and improvement of a self-supplying evaporating fountain, what I claim therein as new, and desire to secure by letters patent, is constructing a vase, or other like article, with two apartments, or chambers, B, C, having a continuous as well as a periodical communication with each other, by which it is rendered a self-supplying evaporating fountain, the continuous communication of the lower chamber, C, with the upper apartment, B, or evaporator, being effected by the pressure of steam upon the surface of the water in the lower chamber, and the periodical communication, by means of the valve, H, secured in the screw nut, F, which will be opened by the pressure of the accumulated water in the upper apartment when relieved of the pressure of the steam in the lower chamber, as fully described and represented.

GEO. H. THATCHER.

No. 8233.—*Improvements in mode of changing Reciprocating into Rotary Motion.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The employment of curved or inclined forks, D', D², and E, E², having a reciprocating rectilinear movement, operating on or operated by cams, *a*, *b*, *c*, in the manner and for the purposes herein set forth.

Second. The use of cams, *a*, *b*, *c*, constructed or attached so that they may be turned or set in order to produce a change in direction of the motion, and acting in connexion with forks, D', D², and E, E², (or their equivalents,) substantially for the purposes expressed, as shown and described.

JOEL V. STRAIT.

No. 8234.—*Improvements in Hanging Carriage Bodies.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the manner, herein de-

scribed, of raising the body on to the springs, or lowering it on to the reaches, as may be desired, and for the purposes herein fully set forth.

JOHN JONES.

No. 8235.—*Improvement in Buffing Apparatus for Daguerreotype Plates.*

We do not claim heating the buffer, as that has been done by lamps operating on the plate on which the buffing material is stretched; but in that form the heat is uneven, and the vapor from the spirit lamp is liable to come in contact with the buffing material. But what we claim as new, and of our own invention, and desire to secure by letters patent of the United States, is the enclosing drum, constructed with the sliding segment or cover, (g.) flanch, 12, and lip, 11, sliding in the grooved plate, 10, and retained by the spring, 13, for the purpose specified, in combination with the drum, *m*, and pipe, *n*, to pass the heat from a spirit lamp, or other heater, to the drum, *m*, for the purpose of heating the buffer, the drum, *m*, being fitted with a pipe, or other means, to pass any vapor from the spirit lamp, outside the case enclosing the buffer, substantially as described and shown.

WM. LEWIS,
W. H. LEWIS.

No. 8236.—*Improvements in Hanging Carriage Bodies.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is—

First. The combination, herein described, of the turning compensating plate, *M*, with the rock shaft, *B*, *C*, and the connecting rods, *N*, for the purpose of equalizing the action on the helical spring, *I*.

Second. I claim the stop lever, *P*, in combination with the turning plate, *M*, used in fastening down the body, substantially in the manner herein described.

Third. I claim the stays, *O*, *O*, for the purpose of keeping the axle trees in their true set or upright position, as herein described and fully set forth.

JOHN JONES.

No. 8237.—*Improvement in Faucets.*

What I claim, therefore, as my invention, and desire to secure by letters patent, is the application of a hollow conical packing around the waist of the valve stem, in combination with an open space between its lower end and the stem, the interior of the tubular projection being smooth, or of such form as to allow a tight joint between it and the conical packing, substantially as above described.

CHARLES W. STEARNS.

No. 8238.—*Improvement in Saddle Trees for Harness.*

I do not claim as my invention the yoke, the terrett, or the pad iron, separate from each other; but what I do claim as my invention, and wish

to secure by letters patent, is the combination and arrangement of the yoke, the terrett, and the pad iron, in such manner that the pad iron may be adjusted at any angle required for use, and immediately secured firmly in its place by a screw on the terrett iron, passing through the yoke into the pad iron, substantially as shown in the drawings and herein set forth.

JAMES A. LAWRENCE.

No. 8239.—*Improvement in Pumps for Raising Water, &c.*

What I claim as my invention or improvement, is as follows: I claim the rod, H, and its arms, or other equivalent contrivances, and its valve collar, as applied to or combined with the rod, F, of the lower box, and the valve or valves made to operate therewith, substantially as above set forth.

JOSEPH F. FLANDERS.

No. 8240.—*Improvement in Cloth Folding Machines.*

What we claim as our invention, and desire to secure by letters patent, first, is the measuring and folding of cloth, paper, and other articles, by means of two revolving cylinders, each of which is provided with a tongue and jaws, the tongue to feed the cloth into the jaws, which seize it and form the fold, and deliver it upon the table, leaving it properly measured and folded.

D. R. AMBROSE,
O. L. REYNOLDS.

No. 8241.—*Improvement in Flour Bolts.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the inclined boards, I, with a case of graduated screens, constructed and arranged substantially as herein described and represented, and for the purpose specially set forth.

SAMUEL COOK.

No. 8242.—*Improvement in Parlor Cooking Stoves.*

Having thus described my improvements in parlor cooking stoves, I shall state my claim as follows: What I claim as my invention, and desire to have secured to me by letters patent, is the arrangement of flues, as herein above described, about the oven of a parlor cooking stove, by which the heat, smoke, &c., are first made to pass over the top of the oven, and then down the passage formed between the front side plate and the side of the oven, across the bottom of the oven up through the passage formed, between the rear side plate and the other side of the oven, and finally out through the smoke-pipe, the heat, &c., being made to pass to the part of the oven most remote from the fire chamber by the partitions, w, w, x, x, on the top and bottom of said oven, substantially as herein above described.

N. A. BOYNTON.

No. 8243.—*Improvements in Mills for Grinding Corn and Cobs.*

What we claim as our invention, and desire to secure by letters patent, is the chopping and feeding apparatus, constructed and operating as herein described, in connexion with a grinding apparatus.

We also claim the recess (*p*) in the concave, which prevents the escape of fragments when struck by the teeth of the cylinder.

SIDNEY A. BANTZ.
WILLIAM ANDREW.

No. 8244.—*Improvements in Carriage Springs.*

Having thus fully described my improved spring reaches for carriages, what I claim therein as new, and for which I desire to secure letters patent, is the combination of the rockers and spring bars of a carriage, substantially as herein set forth, and for the purposes described.

M. G. HUBBARD.

No. 8245.—*Improvements in Stave Dressing Machines.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the arrangement for starting each stave, or introducing it to the feed at the proper moment, consisting of the wheel, *k'*, with its stud, *k''*, the bent lever, *l*, the pitman, *l'*, lever, *l''*, shaft, *l'''*, lever, *l''''* sliding rod, *m*, spring, *m''*, and adjustable starting bar; in combination with the apparatus for giving the reciprocating motion to the jointing cutters, so that the greatest width of the stave may be given on different lengths of staves, uniformly at the middle, or such other point as may be desired; the whole being combined, arranged, and operated in the manner substantially as herein specified.

WM. HAWKINS.

No. 8246.—*Improved Machine for dressing Boot Forms.*

What I claim as my invention is the circular motion of the cutters attached to one end of a lever, the other end being so confined on the opposite side of the boot form as to allow the cutters to play up and down, and dress one or both sides of a boot form at a time, as herein set forth.

JOSEPH BURGESS.

No. 8247.—*Improvement in Feather-edging Gauges for Shoemakers.*

What I claim as my invention is the arrangement of the adjustable gauge rest, the pressure roller, and knife, or cutter, in the case, or handle, substantially as described, and so as to constitute a tool for feather-edging or reducing soles of shoes, as specified.

JACOB JENKINS.

No. 8248.—*Improvement in Bran Dusters.*

I do not claim exclusively the employment of intermediate vanes acting in connexion with the brushes on the reel for forming a blast, as

such has already been used; but what I do claim as my invention, and desire to secure by letters patent, is the employment of adjustable vanes, which may be set in or out, and obliquely, in direction of their length, or be set either way only, as described and represented by the vanes, lettered *f, g*, in the drawing, such adjustable vanes acting in combination with the brushes on the reel, for the purposes and in the manner substantially as set forth.

S. W. KIRK.

No. 8249.—*Improvement in dyeing Door Mats.*

What I claim as my invention, and desire to secure by letters patent, is the coloring of borders and figures in a variety of colors and forms upon the wool of lamb-skins and skeep-skins for mats, and other similar purposes, by the use of pans, (which are to contain the dyes, being made and shapened in the form of the borders or figures designed to be colored,) in combination with the matching tin or form, fig. 2, or an equivalent device, for parting the wool, substantially in the manner and for the purpose herein set forth.

REUBEN SHALER.

No. 8250.—*Improved method of liberating Metal Tubes from forming Mandrel.*

Having now described the nature of my invention, and in what manner the same is to be performed, I wish it to be understood that I do not claim the exclusive use of the rolls for cross rolling, hereinbefore described and represented, except when the same are employed in the manufacture of pipes or tubes of copper, brass, or other alloys of metal, as herein described, to be used as the flues of steam boilers.

But what I do claim in the manufacture of pipes, or tubes, of brass, copper, and alloys of metal, for the use of the flues of steam boilers, by rolling hot on a mandrel, whether parallel or taper, is the enlarging of them by means of cross rolling, as above described, for the purpose of extracting the mandrel.

JOB CUTLER.

No. 8251.—*Improvement in Oil Cups for Journal Boxes.*

I do not confine myself to any form of valve or spring, but what I claim as my invention, and desire to secure by letters patent, is the employment, within the mouth of an oil cup, of a valve, *B*, operated upon by a spring, *C*, or its equivalent, in the manner and for the purpose substantially as herein described.

AARON RICHARDSON

No. 8252.—*Improvement in Fly Traps.*

What we claim as our inventions, and desire to secure by letters patent, are the tube, *C*, in combination with the glass, *B*, and the bottom, *A*, and rod, *F*, for the purpose above described, meaning to vary the construction while keeping the fixture substantially the same.

We also claim the ring, H, which is to close the apertures in the bottom, at E, for the purpose which it is applied, or anything similar in its application.

HARVEY SNOW,
LUTHER T. SMART.

No. 8253.—*Improved Cut-off Gear.*

The arrangement of the lifting rods, and the method of operating them by the disk plate, as represented in the accompanying drawings, is peculiarly suited to this method of effecting the disengagement of the valves from the mechanism by which they are opened, for the disk plate imparts a transverse motion to the connecting rods, which causes them to rock upon the stops, and thus slide off their respective toes on the rock-shaft arms. But while I prefer this arrangement of eccentric gear, I wish it to be understood that I do not restrict myself to its employment, as my improvement may be applied to many other systems of mechanism by which valves are opened. As such systems may not possess the peculiar rocking motion I have mentioned, it will be necessary, in some cases, to disengage the lifting rods by a positive movement, which may, at the proper moment, be imparted to the lifting rods by some moving member of the engine, through the combination of any convenient and suitable mechanical device.

In combination with the reciprocating motions communicated to the lifting rods by the eccentric gear, I claim imparting a lateral movement to the free extremities of said lifting rods, to disconnect them from the valves and permit the latter to close, to cut off the steam or other expansive fluid by which the engine may be driven, whereby these rods are made to perform their usual duty of opening the valves, and, in addition, that of catches or latches in alternately connecting the valves with, and disconnecting them from, the mechanism by which they are opened, thus greatly simplifying the construction of the valve gear, rendering the same more durable and less liable to get out of order.

GEORGE H. CORLISS.

No. 8254.—*Improvements in Flexible Fences.*

Having thus fully set forth and described the nature of my invention, and its practical operation, I do not claim any particular form or construction of a post in connexion herewith, the same not being essential, nor whether the same be of wood or any other substance, (I having heretofore invented a metal post, being a convenient device to use in connexion herewith.)

But what I do claim as my invention, and desire to secure by letters patent, is the form and construction of the two concave plates, with pins near their open ends, forming one coupling-cap, or clasp, for the purpose of uniting together the upper bars of fence, or railing, whether the same be of wood or metal, and also of securing the same by the use of a pin, with a screw thereon, or other device, on the top of a post, in the manner and for the purpose as herein described.

And, in connexion therewith, I claim perforating the bars, or rails, with conical, tapering holes, mortises, or orifices, for the insertion of

pickets, or banisters, in the manner and all for the purpose as is herein substantially set forth and described.

MATTHIAS P. COONS.

No. 8255.—*Improvement in Cast-iron Car Wheels.*

What I claim as my invention, and desire to secure by letters patent, is—

First. A cast-iron car wheel, made with a hollow, chilled rim and hollow spokes, in the manner and form herein set forth.

Second. The method of forming wheels for railroad cars, by casting the rim and spokes upon a grooved hub, which has been formed separately, as herein described.

THOMAS J. EDDY.

No. 8256.—*Spring expanding Swage for Boiler Tubes, &c.*

What I claim as my invention, and desire to secure by letters patent, is an expanding swage, constructed as herein set forth, and consisting essentially of radiating sections, which are connected with each other, and to a common centre, by spring shanks, as herein described.

JAMES McCARTY.

No. 8257.—*Improved Powder proof Bank Lock.*

Having thus described my improvements in locks, I shall state my claim as follows:

What I claim as my invention, and desire to have secured to me by letters patent, is moving the key bit to the tumblers, by means of a follower sliding between the walls, as herein described, which follower acts in such a manner as to close the space into which powder might be introduced, where this is combined with a keyhole cover, sliding as described, by which combination I make a powder-proof lock, with tumblers, which cannot be reached by a pick, and whose slide cannot be blown off so as to secure access to the tumblers.

I also claim the combination with the plate, *a'*, *a'*, of the transverse, sliding, vertical slotted plate, *c'*, *c'*, which, jointly, cut off all communication with the tumblers in every position of the bolt.

WM. HALL.

No. 8258.—(Suspended.)

No. 8259.—*Improvement in Window Sashes.*

Having thus fully described my improved method of setting glass, what I claim therein as new, and for which I desire to secure letters patent, is fastening the bars of two parts, as herein described, by binding them together by a screw at the junction of their ends, their opposite ends being hooked into the frame of the sash, substantially in the manner and for the purpose set forth; and, in combination with this device, I claim the elastic bed for the glass to rest against, as above specified.

SEWELL SHORT.

No. 8260.—(Suspended.)

No. 8261.—*Improvement in Machines for grinding Flock.*

I do not limit myself to grinding or cutting flock, but any article to which the machine can be advantageously applied.

I claim a cylinder or drum, with knives or beaters attached, extending its length; said knives being set at an oblique angle, both with the radial lines and the axis of the drum, in combination with an outer cylinder, within which the drum revolves; the outer cylinder also revolving in an opposite direction, and having on its inner surface, at intervals, knives extending its length; the said knives being parallel with its axis, but oblique to its radius; said outer cylinder also having, in the intervals between its knives, panels, containing projecting ribs oblique to its axis, and so arranged that the action of the revolving knives, upon any material lying between the ribs, shall gradually carry it from the inner to the outer end of said cylinder; thus subjecting the material to repeated cuttings between the revolving knives, substantially as set forth in the above specification.

I claim the method of constructing the outer cylinder of alternate panels—the *one* set being permanent, and having on its inner surface oblique ribs; the *other* set being movable and adjustable (these panels are called cross-bars in above description,) by screws and springs, and having on its inner surface oblique knives; the fixed panels being connected with an outer and concentric ring of metal by chambers or passages, the same being in combination with another cylinder or ring of metal, within which it fits and revolves; which last ring has a hopper upon it to receive the material to be operated on, opening into the said chambers or passages, and by them into the cylinder containing the knives, substantially as set forth in the above specification.

I claim the combination of outer and inner rings, with the inner and outer revolving cylinders, and their knives and ribs, making a machine for grinding flock or any other material, substantially as set forth and described in the above specification.

JOHN C. FONDA.

No. 8262.—*Improvements in Knitting Machines.*

Having thus described my improvements, what I claim as new therein, and desire to secure by letters patent, is:

First. The sliding, independent yarn carriers, each governing an independent thread for each needle, substantially in the manner and for the purpose as described.

Second. I claim operating the yarn carriers simultaneously by means of the conical ring, (*U'*) working in the inclined slit in the carriers, substantially as set forth.

JOHN HENRY BARSANTEE.

No. 8263.—*Improvements in Stoves with Portable Ovens.*

Having thus described my improvements in the portable oven for cooking stoves, what I claim therein as new, and desire to secure by letters patent,

is in combination with a portable oven. I claim the permanent damper plate or shut off, M, which forces the heat and smoke, after striking against the bottom of the oven, to pass up the front flue and over the oven, and then down the back, passing down behind the permanent damper plate or shut-off, M, and out through the ordinary draught or top flue, B, of the stove, being so simple in its construction that it may be made by an ordinary tinman to suit any ordinary stove, as described and represented.

GEO. H. THATCHER.

No. 8264.—*Improvement in Seeding Apparatus of a Seed Planter.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the measuring seed roller with the distributing seed roller, the two being arranged and operated in the manner and for the purpose herein described.

DAVID HORNER.

No. 8265.—*Improvement in Machines for preparing Hubs for the reception of Boxes.*

What I claim as my invention, and desire to secure by letters patent, is the sliding shaft, with the slot, marked 4, passing longitudinally into the mandrel, together with the screw thread cut upon the mandrel to feed the knives, and the knives, which are so adjusted as to act at both ends at the same time, and also cross-stays, similar in construction (which may be formed of wood) to those marked 1 and 2, in the above description, which are intended for the purpose of fastening and truing the hub; all of which will appear by the above description, except the cross-stays, for the purpose of securing and truing the hub during the process of boring.

HENRY MOORE.

No. 8266.—*Improved Fittings for Boats, to facilitate the discharge of Cargo, &c.*

I am aware that vessels have heretofore been constructed with permanent cargo decks, placed at a distance from the bottom of the vessel, and provided with hatchways, through which cargo in bulk could be dropped into cars, arranged to run upon railways secured to the bottom of the vessel; but such decks are expensive in the first instance, are not so well adapted to the unloading of cargo in bulk, and are not susceptible of removal and replacement to fit the vessel, alternately, for carrying cargo in packages and cargo in bulk. These or other objections have proved to be so serious that this mode of fitting up vessels has not been adopted to any extent, and I make no claim to it, my invention being limited to a deck of narrow sections, and wholly removable; therefore,

What I claim as my invention, and desire to secure by letters patent, is the cargo deck, formed of loose, narrow sections, so that it may be removed to adapt the vessel to carrying cargo in packages, or may be put in place to facilitate the unloading of cargo in bulk, in combination with the railway on the floor, for transporting the lading to the point whence it is removed from the hold.

WM. H. BRYAN.

No. 8267.—*Improvement in Machines for preparing Hubs for Boxes.*

Now, what I claim as new, is the combination of the movable cutters with the saws and small pins, arranged and operating substantially in the manner and for the purpose herein described.

I do not claim the cutters singly, or the arbor or disk, or the saw, such things having been used separately before.

WM. R. JONES.

No. 8268.—*Improvement in Tight Joint for Tuyers.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the combination of the inner and outer beads on the top plate, between which is placed clay or other plastic material, and the grooves in the edges of the sides of the tuyer, for the purpose of making an air-tight joint; the whole being secured by bolts, with a projection upon them, catching over a cam cast on flanges, on the under plate, as herein described and represented.

WM. GRAHAM.

No. 8269.—*Improvement in Brick Machines.*

Having thus described my improvements, what I claim as new therein, and desire to secure by letters patent, is, *first*, the arrangement of the apparatus for moving the moulds and the pressing apparatus, all constructed substantially as herein described, and worked by the revolving shaft, in the manner and for the purposes set forth.

LUTHER BROWN.

No. 8270.—*Improvement in Grain Winnowers and Separators.*

I claim the elevator, constructed substantially as herein set forth, with oblique plates or blocks, to support the straw and facilitate the separation of the grain.

I also claim the arched grating, in connexion with a blast, to effect the separation of the lighter impurities from the grain.

I likewise claim the arrangement, substantially as herein described, of the air-chamber between the fans, the suction-pipe, to supply the chamber with air, and the spout, to conduct the once winnowed grain from the screen into the lower extremity of the suction-pipe, to be winnowed a second time by the entering current of air; whereby the grain is subjected to the full force of two independent blasts, acting consecutively, which insures its effectual winnowing, as herein set forth.

A. B. CHILDS.

No. 8271.—*Improvement in Brick Machines.*

First. What we claim as our invention, and desire to secure by letters patent, is the arrangement of mechanism, substantially as herein described, viz: the toothed wheel, M, and the cams, *h*, and *i*, operated by the changing gear, or the equivalent thereof, connected with the mill, so as to be moved alternately back and forth, for the purpose of operating

the mould carriage and the pressing piston, P, substantially in the manner herein set forth.

Second. We also claim the adjustable rod, S, or its equivalent, connected with the piston-rod, P, for the purpose of acting upon the catch lever, K², or its equivalent, so as to disengage the weigh, C, or its equivalent, by which the operating machinery is thrown out of gear, for the purpose of arresting the pressing motion as soon as the piston has been depressed far enough to fill the moulds.

Third. Is the circular projection, V, or its equivalent, upon the wheel, L, to throw the wheel, L, out of gear, and stop the moulding apparatus while the grinding proceeds.

JAMES DANE,
DARIUS HEALY,
GARY CUMINGS.

No. 8272.—*Improvements in dressing Mill-Stones.*

Having thus fully, clearly, and exactly described the nature, construction, and operation of my invention—being an improvement in dressing mill-stones—what I claim therein as new, and desire to secure by letters patent, is the dress given to mill-stones, according to the definite and fixed rule described in the foregoing specification, and illustrated in the drawing by the furrows (a) (b) (c) of each quarter.

I also claim diminishing the draught of the runner and increasing the number of the quarters, in comparison with that given the bedstone, for the purpose of giving the furrows of each stone, as determined by the rule laid down in the specifications, a shears-motion upon each other.

MORE HOLDIN.

No. 8273.—*Improved Water-Level Indicator for Steam Boilers.*

What I claim as my invention, and desire to secure by letters patent, is the connecting the ordinary float, placed within a steam boiler, with an index placed on the outside of the same, through the medium of the valve of a gauge-cock, by which I am enabled to remove any impurities which may at any time hinder the effective action of the float, substantially as herein set forth.

ALBERT H. JUDD.

No. 8274.—*Improvement in Shutters for Shop Fronts.*

Having thus fully described my improved shutter, what I claim therein, is, in combination with the sliding shutter, substantially as above described, the door by which it is fastened, and which permits it to slide back.

JAMES ROOT.

No. 8275.—*Improvements in Metallic Alloy Paints.*

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is making paints out of metallic antimony, whether prepared separately or combined with other metals, to form alloys suitable for making paints, substantially as herein set forth.

I also claim combining antimonial alloys with oxide of copper, to constitute, with the painting vehicles herein specified, the exterior coatings for ships' bottoms, for the purpose of more effectually defending them against the adhesion of shells and weeds, substantially as herein set forth.

CHARLES WETTERSTEDT.

No. 8276.—*Improvement in Hot Air Furnaces.*

What I claim as my invention, and desire to secure by letters patent, is the employment of a flue or chamber, J, having a valve, *b*, and apertures, *a, a, a*, in combination with an internal flue, K, constructed and operating substantially as shown and described, for the purposes set forth.

JOSEPH C. TREAT.

No. 8277.—*Improvement in quadrant-hinged Grates.*

Having thus described my improvement in the quadrant-turning grate, I wish it to be understood that I do not claim a grate turning upon pivots, projecting from its upper front corners in such a manner that, when it is desired to discharge its contents, the lower rear portion will be made to recede from the back wall, while the front portion of the grate will project frontward beyond the breast of the chimney, and the contents discharged therefrom upon the hearth; but what I do claim as new, and of my own invention, and desire to secure by letters patent, is suspending the quadrant grate by pivots, B, projecting from the ends thereof, near the centre of the circle of the grate, in such a manner that, when it shall be desired to discharge the contents from the grate, its rear and lower portion will be made to recede from the back wall, C, and rise in the throat of the chimney; and thus the contents will be discharged into the rear portion of the fire-place, and the dust carried directly up the chimney; and the grate moving outward having to drag through the accumulated coal ashes, &c., in the fire-place, as described.

I also claim the combination of the guard plate, G, with the quadrant grate; said guard plate projecting from the back of the fire-place horizontally above the lower rear edge of the grate, and vertically within the ends of the same, for the double purpose of forming a support for the fire brick, or back of the grate, and protecting the inner edges of the bottom and ends of the grate, and preventing it from being opened by the lumps of coal that would otherwise fall between its edges and back wall, and force the grate open as described.

GEORGE H. THATCHER.

No. 8278.—*Improvement in Shuttle Motion of Looms.*

What I claim as my invention, and desire to secure by letters patent, is operating the picker-staff, or staves, H, by a cam or cams, M, upon a shaft, K, hung in bearings, L, attached to the lay, and carrying a ratchet

wheel, N, which receives motion at suitable intervals through an arm, Q, worked by the same motion which operates the lay, substantially in the manner herein described.

GEORGE J. WARDWELL.

No. 8279.—*Improvement in Machines for taking Ayes and Noes.*

Having thus fully described my improvements, what I claim as new therein, and which I desire to secure by letters patent, is the peculiar form and action of the springs, which carry the pencil by which a draw mark is made, without risk of breaking the point.

G. WM. YERBY.

No. 8280.—*Improvement in working clay for Pottery and other Ware.*

It will be seen that my process of heating clay while working is equally applicable to making bricks, pottery, clay retorts, and every article of clay goods; and, consequently, no machinery or heating apparatus can be described or shown, as it must be varied according to the particular manufacture; and I do not mean to limit myself in this particular, but to use such means as may be best adapted to heating and working the clay for the particular purpose; nor do I mean to limit myself to the precise temperature of the clay, as that must be regulated by the kind of clay, and the condition of the atmosphere, but to work the same at or about the boiling point of water; neither do I mean to limit myself to any peculiar clay, compounds of clay, or mixtures of clay and other substances.

Therefore, what I claim as my invention, and desire to secure by letters patent of the United States, is the application of heat to clay during the process of mixing, working, or tempering the clay; so that it is raised to a heat at or about the boiling point of water at the time of moulding or forming the same, substantially as described and shown.

JOHN AKRILL.

No. 8281.—*Improvement in Looms for weaving Pile Fabrics.*

Having thus set forth the principle of my invention, and the manner of constructing and using the same, I wish it to be understood that I do not limit myself to the special construction and arrangement of parts herein specified, as these may be varied without changing the principle or mode of operation.

What I claim as my invention, and desire to secure by letters patent, is the employment, on one or both sides of the loom, of two carriers, to which the figuring wires are secured, and two guides, substantially as described, and operated alternately; the said carriers having a motion towards and from the selvage of the cloth, to draw out and insert the wires, and, together with the guides, a motion towards and from the lay, to carry the wires from the woven pile to the open shed, and back, as described.

And I also claim, in combination, giving to the guides a vertical movement, after the wire has been drawn out, to admit of their passing each other, substantially as specified.

JOHN JOHNSON.

No. 8252.—*Improvements in Sewing Machines.*

Having thus fully described our invention, what we claim therein as new, and desire to secure by letters patent, is—

First. The combination and arrangement of the pitman, driving-bar, shuttle, and adjustable set screw, for the purpose of allowing the pitman a continuous motion, whilst the shuttle-bar and shuttle is momentarily stopped, to allow the needle to draw up the stitch, as herein described and represented.

Second. We claim bringing up the needle with a sudden jerk, after the stitch is formed, for the purpose of tightening up the stitch, after the manner of hand-sewing, and adjusting the same to any thickness of material to be sewn.

WILLIAM H. AKINS,
J. D. FELTHOUSEN.

No. 8283.—*Improvements in Looms for weaving Cut Pile Fabrics.*

Having thus described my invention, I do not mean to limit myself to this particular method and construction described, but to the characteristics or principles of the operation—for instance, in proper construction of a loom, there would be necessary a pair of fingers, or shields, on each side of the cloth, and it might be found advisable to make a movement of the fingers, or shields, only when a shuttle was thrown from the respective side. This could be done by connecting the movement of the shield to the cam-shaft.

What I claim as my invention, and desire to secure by letters patent, is—

First. The use in looms of a finger or shield, which shall be introduced between the warps, for the purpose of bringing the warp threads at the edge of the cloth in such a position that the filling yarn will be drawn in to form a smooth selvage, substantially as described.

Second. The use of hooks formed on the intersecting plates, or their equivalents, which shall hold the filling thread from returning towards the reel, substantially as described.

M. C. BRYANT.

No. 8284.—*Improvement in Brick Machines.*

What I claim as my invention, and desire to secure by letters patent, is the placing the auxiliary pressure roller, *p*, or its equivalent, between the main roller, *B*, and the knife, *n*, for the purpose of subjecting the surplus clay, after it is elevated above the tops of the moulds, to the action of pressure before moving the same by the said knife, substantially as herein set forth.

I also claim the subjecting the upper surface of the clay in each mould to a rubbing pressure by means of a plate, *m*, or its equivalent, placed above the tops of the moulds, in combination with some mechanical device for forcing up the movable bottoms of the said moulds whilst passing under the said plate, substantially in the manner and for the purpose herein set forth.

ISAAC GREGG.

No. 8285.—*Improvement in Printing Presses.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Giving to the platen a rotating reciprocating motion, which enables it to assume the two positions of receiving the sheet and the impression alternately, when operated by the cam, sectional arm, and its own segment, geared with the segment of the sectional arm, by giving to it the movement described of an arc of the circle when traversing from one of these positions to the other.

Second. I claim affixing the vibrating bed on its own axis, so that it may recede into the proper position for receiving the inking rollers for inking the form, and become perpendicular and directly face to face with the platen, when the toggle is straight, for the purpose of giving the impression.

Third. I claim the arrangement of two side arms so combined as to form a frame to hold and carry the inking rollers, and giving to them the motion, both forward and backward, over the form for each impression during the rest of the other parts, whether the same be done in this precise manner, or equivalents, to produce a like result.

Fourth. I claim the grooved cam-shaped arms or guides, or their equivalent, for the purpose of carrying the frisket in the right direction, and holding it in the desired positions during the intervals of rest given to the platen—that is, opening it to relieve the printed sheet, and holding it open to lay the succeeding sheet, and closing it firmly against the platen to grip the sheet, and holding it closed until the bed has moved forward, given the impression, and receded to its original position.

Fifth. I claim the combination of the bed vibrating on its own axis with the roller frame, composed of two arms, substantially as herein described and set forth.

GEO. P. GORDON.

No. 8286.—*Improved Spring Bolt.*

What I claim as my improvement is the combination of the lever with the spring bolt, and its case, so as to operate therewith, substantially in the manner as specified.

OLIVER H. BUSH.

No. 8287.—*Improvement in Machines for cleansing Wool.*

I do not claim either of the parts of the apparatus, as such, as my invention; but what I claim as my invention, and desire to secure by letters patent, is the combination of the tub, C, with the shaft, E, and tube, F, when these are combined with the vat, A, (with its trough, *a*, and *a'*), and the whole is constructed, arranged, combined, and operated substantially as herein described, for the purpose of cleansing or for coloring wool and other analogous substances, as herein described.

L. W. BOYNTON.

No. 8288.—*Improvements in Machines for Jointing Staves.*

What I claim as my invention, and desire to secure by letters patent, is combining with the adjacent ends of any two plates of the chain the hinged pieces provided with self-acting toes, for clamping the stave while it is being jointed, and then releasing it, substantially in the manner and for the purpose described.

LEWIS S. CHICHESTER.

No. 8289.—*Improvements in Spike Machines.*

Having thus fully described my invention, I do not claim the header, N, or the holding die, Q, irrespective of their arrangement and operation; but what I do claim as new, and desire to secure by letters patent, is the arrangement of the carrier, H, within the hollow table, B, substantially in the manner described, and also the combination of a carrier, so arranged with a single gripping die, Q, arranged with respect to it in the manner substantially as shown; the die and the carrier assisting each other in holding the spike while being headed.

MARK M. ISON.

No. 8290.—*Improved Water Gauge for Steam Boilers.*

I claim the combination of the glass tube and reservoir of fluid below it, heavier than that contained in its upper part, with the legs of a syphon, so that they become a part of that syphon, substantially as described, by which means I am enabled to protect the glass tube from the heat of the steam and impurities of the water, and also to show at any point above the boiler the height of the water in the boiler.

I also claim the combination with the gauge of the sediment depositor, constructed and arranged substantially as described, for the purpose of preventing the impurities of the water from entering the tube leading to the gauge.

A. S. LYMAN.

No. 8291.—*Improvement in machines for numbering the pages of Account Books.*

Having thus described my new machine, I shall state my claims, as follow:

What I claim as my invention, and desire to have secured to me by letters patent, is—

First. The use of type chains in a machine for printing the pages of account books; and,

Second. A machine for paging account books, having the essential elements hereinabove described, viz: the imprinting cylinders and rollers, against which they bear, together with the type chains, arranged together substantially in the manner hereinabove described.

JOHN McADAMS.

No. 8292.—*Improvement in the manufacture of Pigments.*

I am aware that a mixed chloride and oxide of lead has been long known, under the name of "Turner's Yellow," which is made by mixing oxides of lead and common salt.

I therefore do not claim this composition of matter; but what I do claim as my invention is the new manufacture of either a white or colored pigment, by the addition of one half of an equivalent of lime, or other earthy or alkaline base, with one equivalent of chloride of lead, or chloride of lead diffused in water, or however the solution may be obtained; the whole being substantially as hereinbefore specified.

H. L. PATTINSON.

No. 8293.—*Improvement in method of forming Teeth upon Cast Iron Grinders.*

I do not claim the casting of ribs or floats; but what I do claim as my invention, and desire to secure by letters patent, is the mode, herein substantially described, of making or forming teeth or grinders upon surfaces of cast iron, by nicking, craking, or chipping out parts of ribs or floats cast thereon, so as to leave the teeth or grinders projecting, as above set forth.

EZRA RIPLEY.

No. 8294.—*Improvement in Sewing Machines.*

What I claim as my invention, and desire to secure by letters patent, is giving to the shuttle an additional forward motion after it has been stopped, to close the loop, as described, for the purpose of drawing the stitch tight, when such additional motion is given at and in combination with the feed motion of the cloth in the reverse direction, and the final upward motion of the needle, as described, so that the two threads shall be drawn tight at the same time, as described.

I also claim controlling the thread during the downward motion of the needle by the combination of a friction pad, to prevent the slack above the cloth, with the eye on the needle carrier, for drawing back the thread, for the purposes and in the manner substantially as described.

I also claim placing the bobbin from which the needle is supplied with thread on an adjustable arm attached to the frame, substantially as described, when this is combined with the carrying of the said thread through an eye or guide attached to, and moving with, the needle carrier, as described, whereby any desired length of thread can be given for the formation of the loop without varying the range of motion of the needle, as described.

ISAAC M. SINGER.

No. 8295.—*Improvement in construction of Roofs.*

What I claim as my invention is the above-described peculiar arrangement of the arched trusses or framing of my improved roof, in combination with the suspending of both inclined sides of the roof from the ridge

timber, so that each inclined side shall be made to counterbalance the other inclined side, and by so doing operate to prevent lateral and horizontal thrust upon the side walls, all essentially as specified.

FRANCIS WILBAR.

No. 8296.—*Improvements in Sewing Machines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The combination of the rotating hook, to extend the loop on one thread, with a reciprocating bobbin, to carry the other thread through the loop so extended, for the purpose of interlacing the two threads together, whether the parts be severally arranged and operated as herein set forth, or in any other way substantially the same.

Second. The hollow mandrel, constructed substantially as herein set forth, with a groove on its periphery, to give a reciprocating motion to the bobbin, a segmental screw thread, to feed the cloth forward as the sewing progresses, and a hook and groove on its extremity, to form loops on the needle thread, in combination with a reciprocating bobbin; the whole arranged and operating substantially as herein set forth.

ALLEN B. WILSON.

No. 8297.—*Improvement in Shoulder Braces, combined with Abdominal Supporters.*

Having thus fully described the nature of my improvements, what I claim therein as new, and desire to secure by letters patent, are—

Firstly. The bars (*a*) having a common point of junction to a centre bar at the back, passing thence under the armpits, and thence forward, upward, and backward, until their padded extremities bear upon the clavicle; the bar being so formed as to fit snugly without direct pressure upon the body, except at the points at front and back, as herein explained, giving the desired support to the shoulders without unnecessary confinement of the person or obstruction of its various functions, and at the same time affording, through the medium of the bar, (*d, e,*) a firm point of attachment and support for a uterine or abdominal supporter.

Secondly. The jointed bar, (*d, e,*) having pads (*c, c, i, i*) located on each side of the spine, at the junction of the said bar with the braces, (*a,*) (*g,*) the said bar being jointed midways, so as to admit of easy flexion sideways, without compromising the rigidity which is necessary in other directions, and affording, by the limited extent of its pressing surfaces, free scope to the circulation, perspiration, muscular action, and other bodily functions.

JOHN S. DARE.

No. 8298.—*Improvement in ventilating and excluding Dust from Railroad Cars.*

What I claim as my invention, and which I desire to secure by letters patent, is the combination of the blower, bellows, or forcer, with the pipes or tubes for conveying the pure air along the train of cars, the pipes or apertures for the admission of air into the cars, the valves or inverted

mufflers for controlling such admission of air, together with the valves and apertures for regulating the atmospheric pressure within the cars, and its escape from them, all as hereinbefore set forth.

RANSOM COOK.

No. 8299.—*Improvement in the manufacture of Brushes.*

What I claim as my invention is the above-described improvement in the manufacture of brushes, the same consisting in laying two or more brush blocks or plates together, or upon one another, and either boring them before or afterwards, and each with the same number of holes, and so that each hole in each block shall be in range with a hole in each of the other blocks, and passing or inserting bunches of bristles through all the blocks, and fastening the ends of said bristles in the last block, through which they are made to enter, and separating the said blocks asunder, and cutting the bristles between the blocks, all substantially as hereinbefore set forth.

ABB'T R. DAVIS.

No. 8300.—*Improvement in Cooking Stoves.*

Having thus fully, clearly, and exactly described my improvements in double oven cooking stoves, what I claim therein as new, and desire to secure by letters patent, are the closed chambers (*l*) and (*m*), and opening, (*i*), in connexion with the space between the hearth plate, (*c*), fire back, (*d*), and boiler flue plate, (*e*), and the upper portion of the ovens at their plates, (*f*), (*g*), and (*h*), the whole being arranged substantially in the manner, and for the purposes described.

HOSEA H. HUNTLEY.

No. 8301.—*Improvement in Brick Machines.*

What I claim as new in my invention, and desire to secure by letters patent, is—

First. The mode of controlling the operation of the mould bed carriage, and driving it in either direction by the combination, substantially as described, of the toothed wheel, *G*, on the mud mill shaft, the rack bars, *k*, *k'*, and their racks, *l*, *l*, and arms or ears, *m*, *m*, attached to the carriage, and the slides, *o*, on the stationary framing.

Second. The mode of operating the cut-off plate, *L*, *L*, for the purpose of opening and closing the apertures communicating between the mud mill and the moulds, by means of the levers, *N*, *N'*, attached to them, and to the framing, in combination with the wheels, *o*, *o'*, *o''*, *o'''*, on the mould bed carriage, substantially as herein shown.

RICHARD LONG.

No. 8302.—*Improvement in Cooking Ranges.*

First. I do not claim to be the inventor of brick oven; but what I do claim as my invention, and desire to secure by letters patent, is the attachment of a brick oven to cooking range, to be heated from the same fire with which the cooking is done, as herein described.

Second. I also claim the hot air-chamber, I, at the sides of perpendicular plates, *i, h*, and extending as high as horizontal plate, *i*, and all over curved plate, *i, i*, and extending all around inclined pipe, *F'*, and perpendicular pipe, *i, F*, and communicating with pipes, *J*, in the manner and for the purpose herein set forth.

NICHOLAS MASON.

No. 8303.—*Improvement in Chemical Processes for fulling Vegetable and other Textures.*

I may, in conclusion, remark, that the description of the apparatus or machinery and the strength and temperature of the soda or potash, sulphuric acid, or chloride of zinc solution, may be varied to a considerable extent, and will produce proportionate effects without at all deviating from my invention; for instance, caustic, potash, or soda, may be used even as low as twenty degrees, Twaddle's hydrometer, and still give improved properties to cotton, &c., in receiving colors in printing and dyeing, particularly if the heat be low; for the lower the temperature, the more effectively the soda or potash acts on the fibrous material above described: I therefore do not confine myself to any particular strength or temperature of the substances I employ, but the particular strength, heat, and process here described, are what I have found the best, and which I prefer.

And I claim, as of my invention, the process of fulling cotton, linen, and other vegetable fibrous material, either in the fibre or any stage of its manufacture, or either alone or mixed with silk, woollen, or other animal fibrous material, by means of astringent or styptic materials, as set forth.

JOHN MERCER.

No. 8304.—*Improvement in Registers for Omnibus Drivers.*

What we claim as our invention, and desire to secure by letters patent, is the arrangement of a series of doors, with the attachment to the axes or hinges thereof of levers or other mechanism, in such a manner and in such connexion, by means of a rod or rods, and springs, or other suitable contrivance or device, with a dial, or some like mechanism, that each door, upon being opened, will act upon such dial or other mechanism in such manner as to indicate thereon and thereby the number indicated by such door, the several doors indicating different numbers respectively; also the arrangement of a strip of metal or other suitable substance, vertically or in some other position, in connexion with such dial, so that by means of a wedge upon the dial and pins upon the said strip, or *vice versa*, under which, or over which, the wedge successively passes, the said strip will rise or be forced outward from the circumference of the dial a given distance at each revolution of the dial, and indicate, by the figures on the surface of such strip, near the outward or upward end of the same, successively coming in sight above or beyond the circumference of the dial, the number of such revolutions of the dial, using for the construction of the same any metal or metals or other substance of a suitable and durable description.

IRA. B. PERSON,
JOEL L. BROCKETT.

No. 8305.—*Improvement in Boot Crimps.*

What I claim as my invention, and desire to secure by letters patent, is the lever, C, the knob, F, the bolt, G, and the two circular rods, E, E, in combination with each other, and with the other parts of the machine, as described, for the purpose of drawing the corners of the front to their proper place at the same time the brake is passing down over it by turning the screw, I; and I make no further claim.

HARTWELL STANLEY.

No. 8306.—*Improvement in Pulp Screens.*

I prefer to have the screen plates, e, constructed of brass; the other parts described may be of wood, with the exception of the bellows; but I do not confine myself to any particular material.

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the application of the vibrating bottom or bellows, C, to the box, A, A; said box being constructed as described, with the partition, B, and the screen, D, upon its upper surface; by which arrangement the pulp is forced by atmospheric pressure between the plates of the screen upon the partition, B, and off the partition into a receiving box, E, substantially as described.

GEORGE WEST.

No. 8307.—*Improvement in Ships' Model Measurer.*

What I claim as new in my invention, and desire to secure by letters patent, is the employment, for the purpose of taking the dimensions of models of ships and all other vessels, of a pillar or post, A, having a graduated scale, B, on one side, and an adjustable rest, D, sliding on it, and having also a rule, o, with any number of graduated scales on its face, and a leg, G, connected with it, both the rule and leg being capable of adjustment in lines at right angles to the face of the pillar or post; the whole being constructed, arranged, and operated in the manner substantially as set forth.

ABIJAH S. HOSLEY.

No. 8308.—*Improvement in process of reducing Ores by Zinc Compounds.*

What I claim as my invention, and desire to secure by letters patent, is the use, in combination, of the several processes described, for the manufacture of zinc white, as a specific means of treating ores containing any number of metals, and separating the metals from each other by virtue of the chemical affinity of zinc, or its oxide for sulphuric acid, as described; and this I claim, with or without the aid of other chemical agents or affinities, substantially as described.

E. LOUIS SEYMOUR.

No. 8309.—*Improvement in Washing Machines.*

Having thus fully, clearly, and exactly described the nature, construction, and operation of my improvements in washing machines, what I

claim therein as new, and desire to secure by letters patent, is the chamber or tub, (*d*,) with its narrowed neck, and otherwise constructed substantially as described, in combination with the plunger, (*c*,) which latter, with the clothes wrapped round it, passes through the narrowed neck of the chamber, and, pressing forcibly on the water confined within the body of the chamber, drives it violently in the direction of the arrows and through the body of the clothes, carrying the dirt with it.

DAVID ALLAN.

No. 8310.—*Improvement in Cabbage Cutters.*

Having thus described my improvement on the machine for mincing cabbage, what I claim therein as new, and desire to secure by letters patent, is the two vertical bars, *L, L*, confined to the sides of the feeding box, *E*, so as to rise and fall with the movement of the feeder, *R*; said vertical bars, *L, L*, having handles, *M*, by which the operator actuates the feeding box, and, by the same exertion of his arms, renders the material self-feeding simultaneously with the reciprocating motion of the box, *E*.

HIRAM CARVER.

No. 8311.—*Improvement in Self-acting Cheese Presses.*

What we claim as our invention, and desire to secure by letters patent, is the combination of the falling frame with the toggle-joint, and levers, and the fixed eccentric wedge, acting together and making the upward movement and pressure, substantially as herein set forth and described

BETHUEL GILLET,
LYMAN ALLIS.

No. 8312.—*Improvement in Dental Hydraulic Cups.*

What I claim as my invention is the construction of said machine, of two or more plates, with vacancies between the same, and with pipes annexed thereto.

And also I claim as my invention the application of water, or any suitable liquid, to the space or vacancy between the plates, for the purpose of hardening and rendering more firm the contents of the cup while on the jaw. I claim nothing for the outward form of the said plates, nor for the application of the same to the mouth merely to take impressions. And also I claim as my invention the method of using the gate as described.

JAMES HARRISON.

No. 8313.—*Improvement in Rotary Harrows.*

Having now described my invention, and the operation of the same, I will proceed to state what I claim, and desire to secure by letters patent of the United States. What I claim, therefore, is the use of the combination of the spur-wheel, *H*, and cog-wheel, *D*, with the hollow axis, *G*, for the purposes and in mode of construction substantially as herein set

forth, and their combination with the circular frame, B, having the face cog-wheel, C, and arms, A, attached, for the purpose of producing a rotating harrow, substantially in principle of construction as herein set forth.

JONATHAN F. OSTRANDER.

No. 8314.—*Improved Pad-Lock.*

Having thus fully, clearly, and exactly described the nature, construction, and operation of our improved mail-bag, spring, and safety pad-lock, what we claim therein as new, and desire to secure by letters patent, is the combination of the bolt (*p*) and cavity (*y*) on the rotating end of the hasp, with the tumblers, (*a*) and (*g*) having the characteristics described, or their equivalents; the tumblers, hasp, and bolt constituting a system of fastenings within and without the casing of the lock; the whole being arranged and operated substantially in the manner and for the purpose described.

GEORGE MCGREGOR,
ROBERT LEE,
THOS. G. CLINTON.

No. 8315.—*Improved Adjustable Tool-Haft.*

I do not confine myself to the formation of the eccentric on the gripe, for the effect will be the same if the groove be made on the inside of the revolving tube, C, and the pin, *d*, be fastened to the gripe, A. I do not claim the gripe as any novelty; but what I do claim as my invention, and desire to secure by letters patent, is the mechanism by which its jaws are closed, the same consisting of the eccentric groove, the pin, and the revolving tube, as described in the above specification, and shown in the accompanying drawings.

PETER H. NILES.

No. 8316.—*Improvements in Insulators for Lightning Rods.*

What I claim as my invention is the insulated support and point for lightning rods, consisting of the insulated point, and opening in its shank; the insulating cylinder of glass, with its lip, or flange; and the wooden collar, for securing the whole to the building; all as described.

GEORGE W. OTIS.

No. 8317.—*Improvements in Breech-loading Fire Arms.*

What I claim as my invention, and desire to secure by letters patent, is operating the breech pin directly by the finger lever, as herein described, in combination with the breech pin and abutting lever, formed and operating substantially as herein described, and for the purpose specified.

I also claim elevating the charge lifter, by the direct contact of the breech-pin carrier with an arm of the lifter lever, and depressing it by the direct contact of the finger lever with the other arm of the said lifter lever, as described.

HORACE SMITH.

No. 8318.—*Pad Lock.*

What I claim as my invention is the combination of the turning hasp, or contrivance, C, the tumbler, E, and the slide, G, and its projection, I, or any mechanical equivalents; the whole being made to operate together substantially as described.

DAVID TILTON.

No. 8319.—*Improvement in Lime Kilns.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is—

First. So forming the fire space in lime kilns which are fired at both ends as to rise gradually from the centre of the kiln to points above the eyes in each end thereof, substantially as herein described, for the purpose of so distributing the draught and heat as to secure the even burning of the stone.

Second. I claim dividing the fire space, by a partition wall in the centre, into two chambers, for the purpose of shifting and regulating the heat required in either end of the kiln, substantially as herein described, for the more evenly burning of the stone.

Third. I claim, in combination with the fire chambers and partition wall, the ash pits at each end of the kiln, connected by a narrow flue, so that when the eye at either end may be closed for shifting the heat, sufficient draft will be kept up from the opposite end of the flue to allow the fire to burn moderately, without being entirely extinguished, as herein fully set forth.

SAMUEL BROWN.

No. 8320.—*Improvement in Horizontal Square Piano Fortes.*

What we claim as our invention, or improvement, and desire to secure by letters patent, is connecting and combining in the horizontal square piano forte, in one piece of cast iron, or other metal or metals, the bridge, A, the brackets, C, the upper bearing by the flanges, F, the reverse bearing on the buttons, G, the application to the long bridge of the horizontal square piano forte of the method of firmly securing the whole to the rest plank by means of the screws, I, and the application of the diagonal position of the face of the flange, so as to make both strings of each note of equal length to metal bridges on horizontal square piano fortes, as seen at H, in the manner and for the purpose intended, described in this specification, and seen in the model and drawings by which it is accompanied.

GEORGE BACON,
RICHARD RAVEN.

No. 8321.—*Improvement in means for obviating difficulties arising from defective insulation of Telegraphs.*

Having thus fully described my improvements in the working of telegraphs, what I claim as new therein, and desire to secure by letters patent, is reversing the connexion of the main wire with the poles of

the battery, so that the battery acts in opposition to the battery at the other end of the line, in the intervals between the contacts made by the key in writing, (in place of merely breaking the circuit,) by means of the apparatus and arrangement of wires, batteries, &c., substantially as above described, for the purpose of counteracting the effects of imperfect insulation, as set forth.

CHARLES S. BULKLEY.

No. 8322.—*Improved Nut and Washer Machine.*

We claim the two punches, moved at the same time, with different velocities, and in the same direction, in combination with a die box, within which the nut is formed, substantially as herein set forth.

HENRY CARTER,
JAMES REES.

No. 8323.—*Improvement in Machinery for Cutting Glass.*

What I claim as my invention, and desire to secure by letters patent of the United States, is—

First. The combination and arrangement of the several parts for giving the reciprocating and circular movements herein described—that is to say, the combination of the bed plate, H, and revolving plate, I, with the carriage, consisting of the pieces, K, L, M.

Second. The method of guiding the movements, and adjusting the several parts of the machine, for the purpose of directing the course of the object to be shaped, or figured, in passing the edge of the cutting wheel, by means of movable lettered or named stops and gauges, prepared for particular patterns, and applied to the machine, as required; the whole being constructed and operating substantially as herein set forth.

J. P. COLNE.

No. 8324.—*Improvement in Self-acting Blow-pipe Lamps.*

Having now described the mode of construction and operation of my improved lamp, I will proceed to state what I claim, and desire to secure by letters patent of the United States:

What I claim, therefore, is the use of the safety valve and escape pipe and stop cock, in combination with the blow-pipe of a self-acting blow-pipe lamp, substantially as hereinbefore set forth.

D. W. C. McCLOSKEY.

No. 8325.—*Improvements in Machinery for forming points of Elliptical Springs.*

I claim the combination of the hollow die with the lower die, and have circular shears, actuated in the manner substantially as herein described, and for the purpose herein set forth.

W. T. RICHARDS.

No. 8326.—*Improvement in Cut Nail Machines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. In combination with knives, or the equivalent thereof, for cutting blanks sidewise from nail plate, I claim a travelling, griping, and heading tongs or jaws, opening and closing in a direction perpendicular to the face of the nail plate, and constructed and actuated substantially as herein set forth, to gripe the blank on its flat sides without the necessity of turning it upon edge, as is customary with nail machines heretofore constructed, to draw it from beneath the knives, and hold it while being headed.

Second. I claim the direct acting knife stock, with knives secured to its opposite sides, in such positions with respect to the stationary knives or to each other that the knife upon one side cuts after the knife upon the opposite side, in combination with a double graded cam, or other equivalent actuating mechanism, which shall cause the cutter bar to descend with two impulses, at each of which one knife acts to cut a nail blank.

Third. I claim the relative arrangement of the travelling griping jaws and heading tool, the latter being actuated within the former, and travelling with it.

Fourth. In combination with two sets of knives acting, alternately to sever nail plates, I claim a reciprocating griping and heading carriage, which, travelling to and fro between the two sets of knives, gripes heads and delivers a nail at each single stroke in alternate succession at its opposite extremities, whereby much time and labor are saved, and the machinery to cut a given number of nails is condensed into a less space.

JOHN P. SHERWOOD.

No. 8327.—(Suspended.)

No. 8328.—*Improvements in Spike Machinery.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the method of delivering the spike from the die by means of the tilting rod, O, and the movable nippers, 3, 3, so as to allow the nippers to draw in the succeeding blank underneath the spike, and tip or tilt it out of the die, which prevents the possibility of a spike and blank being in the die at the same time, and the consequent breaking up of the machine.

JAMES H. SWETT.

No. 8329.—*Improvement in Rules for Calculating Interest.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of parallel slides, substantially in the manner and for the purposes herein set forth, one slider being for units, another for tens, another for hundreds, &c., and each slider being so graduated and numbered as to show through the vertical opening, *n, y, f, o*, the sum denoting the interest or tax on the numeral figure that appears on the same slider at the side of the bar, *m, n, o, p*, as herein described.

S. S. YOUNG

No. 8330.—*Improved Saw Filing Machine.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the swinging frame, constructed as described, and for the purpose specified, viz: by having the arms, J, J, J, firmly attached to a rod, I, the ends of the said rod working freely in holes or bearings in the ends of the arms, H, H, which are attached to the horizontal rod, C, by which arrangements the swinging frame has an up-and-down motion, owing to the rod, C, turning in its bearings; also a horizontal reciprocating motion, the same as the rod, C, and a forward and backward motion, by which, with the aid of the file turning on its axis in the frame, the file may be so adjusted as to operate both upon the front and back of the saw teeth, substantially as set forth.

THOMAS M. CHAPMAN.

No. 8331.—*Improvement in method of securing Wheels to Axles.*

We do not claim the securing of a hub to an axle by means of a groove around the inner end of the hub, or a bead on the axle; but what we do claim as new, and of our own invention, and desire to secure by letters patent of the United States, is the application of the cylinder, 5, and flanch, *f*, on the axle, in combination with the cylinder, *e*, flanch, 3, coupling, 7, keys, 12, and coupling box, *g*, to retain the plate, *d*, of the hub, and allow its rotation between the flanches, 3 and *f*, without any tendency to uncouple the hub from the axle, substantially as described and shown.

JUNIUS FOSTER,
DAVID MARSH.

No. 8332.—*Improvement in Double Oven Stoves.*

Therefore, having thus fully, clearly, and exactly described our joint invention and improvements in double oven stoves, wherein the front oven extends under the fire-place, or fire-place and hearth, as may be desired, what we claim therein as new, and desire to secure by letters patent, is the damper, (*a*), constructed and arranged as described, so that one or both ovens may be used at pleasure.

We also claim the flue (K) between the ovens, substantially as constructed and arranged, to communicate directly with the exit flue, (*l*).

We also claim projecting the cold air chamber into the flue under the fire-place, and there discharging the received air, so as to protect the oven from being over-heated at that point.

CONRAD HARRIS,
PAUL WILLIAM ZOINER.

No. 8333.—*Improvement in moulding and casting Stereotype Plates.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The moulding, in plaster, of one or more forms of type, wood cuts, medals, &c., at one operation, in air-tight vessels, by means of exhaustion.

Second. I claim the making of the plaster moulds with two faces.

Third. I also claim the casting, from one or more moulds, in a box sufficiently tight to hold fluid metal, and bringing the face perfect, by means of the weight of fluid metal confined above them in column or otherwise.

Fourth. I also claim the grooved wedges, for retaining the moulds in their places while casting from them.

Fifth. I also claim the non-admission of fluid metal to the moulds until the orifice through which it enters is sunk beneath the surface of the fluid metal, thus preventing the dirt and dross from entering with it.

CHARLES HOBBS.

No. 8334.—*Improvement in drying and oxidizing Colored Goods.*

What I claim as my invention is the application of atmospheric pressure, or the mechanical pressure of air, in the coloring of cotton, wool, or other substances, for removing the excess of liquor absorbed from the vat, and for oxidizing or fixing the color by its forced passage through the mass, and by the use of apparatus, substantially such as herein described.

JAS. C. KEMPTON.

No. 8335.—*Improvement in Mercury Baths for Photographic purposes.*

What I claim as my invention, and desire to secure by letters patent, is my moving and movable lever, cup, or its equivalent, and bath, for photographic and Daguerreotype purposes.

I claim the agitation of the mercury upon a cooler surface, immediately previous to its use, in the heated cup, (or part of it,) for the development of photographic impressions, by means of my movable lever cup, or its equivalent.

I claim the lever cup, or elongated cup, movable perpendicularly, on an axis or centre of motion, which centre of motion need not be confined to a particular part of the cup, but it may be varied and placed in any manner, giving and admitting the movement of the cup, but must be so arranged as that the mercury, or other substance, may flow from the heated surface of the cup to the cooler surface of the tube, or elongated cup, and *vice versa*, by elevating or depressing the exterior end of said cup.

I claim the balancing of said lever cup, or its equivalent, on the centre of motion, wherever placed, so that it will remain stationary, when the weight of the mercury, or other substance, is let on to either end of it, that end containing the mercury, or other substance used, being held down.

JOHN MOULSON.

No. 8336.—*Improvements in method of raising Sunken Vessels.*

I claim the combination of the inflatable air receiver, purchase, roller, and wedge, or their equivalents, as herein described, for the purpose of raising and supporting vessels.

WM. IRWIN.

No. 8337.—*Improvement in the construction of Bridges.*

What I claim as my invention, and desire to secure by letters patent, is the method, above described and shown, of making the thrust arches of bridges—that is to say, I claim the arch constructed partly of wood and partly of iron, when arranged in the manner herein specifically set forth; the iron parts of the arch being constructed in such a manner as to afford a firm bearing for the braces and uprights, with a projecting flanch of sufficient width to shelter the wooden part of the arch, as herein set forth, and the wood being bolted upon the sides, under cover of the flanches of the iron, in such a manner that the wood upon one side can be removed and be replaced without disturbing that on the other. The whole being constructed and put together substantially in the manner and for the purposes herein set forth.

EDWIN STANLEY.

No. 8338.—*Improvement in the construction of Violins, &c.*

Having thus described the construction and effect of my improvements of the violin, &c., what I claim as my invention, and desire to secure by letters patent, is the introduction into the body of the instrument of the brace bar or supporter, C, constructed of any suitable material, and of any requisite form between the upper and lower extremities thereof, inserted either into blocks of wood, A and B, or, instead of A, into an elongation of the neck, to answer the same purpose, by which means I am enabled to give strength to the instrument to resist the strain of the strings, and disconnect the sound board, E, E, and the table or back, from the blocks, A and B, said brace or supporter, C, sustaining the tension of the strings, preserving in tune, and also materially improving the tone, in quality, volume, and melody of instruments to which this improvement is applicable.

I also claim the manner of increasing the vibration of the sound board, E, E, and the table or back, by the cutting away or removing the before-described portions of blocks, A and B, in the manner and for the purpose set forth in the foregoing specification and accompanying drawings.

WM. B. TILTON.

No. 8339.—*Improvements in Cider Mills.*

What I claim as my invention, and desire to secure by letters patent, is the cast-iron grinders, arranged and constructed as described, viz: so as to force the apples, while being crushed, from the centre towards the periphery of the plates, and at the same time to force a portion of the pummace through the holes in the lower plate of the grinders.

I also claim the method of removing the cheese of pummace from the press-crib, viz: by detaching the platform from the press crib, and using the same for a sled, to draw the cheese from the mill, substantially as described.

NATHAN CHAPIN.

No. 8340.—*Improvement in Circuit Changers for Electro-Magnetic Telegraphs.*

Having thus fully described my improvements, what I claim as new therein, and which I desire to secure by letters patent, is the "circuit changer," substantially as above described, in combination with the arrangement of wires, magnets, &c., as set forth, for the purpose of enabling the operator at either one of two distant stations to arrange the connexions at the intermediate stations, so that he can write through to the other end-station at pleasure.

CHAS. S. BULKLEY.

No. 8341.—*Improvement in Machine for making Sod Fence.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the combination of the cutters and mould-boards, for cutting and turning the sod on edge, with the inclined adjustable spring rollers, for raising, packing, and forming the sods into a fence, as herein described and represented.

H. L. F. GAVETT.

No. 8342.—*Improved Hook-heading motion for Spike Machines.*

Having thus described my improvements on the machine for making hook-headed spikes, what I claim as new, and of my own invention, and desire to secure by letters patent, is the employment of a header, made to have a descending, and afterwards a horizontal frontward movement, for the purpose of first bending the end of the piece of iron downward, and then forcing it horizontally against the end of the die, C', and thus form a hook-head, as described and represented.

MOORE HARDAWAY.

No. 8343.—*Improved method of making Sails.*

What I claim as my invention, and desire to secure by letters patent, is the bringing straight cloths upon the leeches, and making all the head cloths parallel therewith, and uniting the goring cloths in the bunt of the sail, as described above.

ELI F. SOUTHWARD.

No. 8344.—*Gold Amalgamator.*

What I claim, therefore, as my invention, is as follows: I claim the combination of the partition, S, (dipping below the surface of the water,) with the lower distributor, provided at the centre with a discharge aperture for the water and light particles, and at the periphery with apertures for the discharge of the water and heavier particles, for the purpose of preventing the escape of gold over the central or waste-pipe.

I also claim the arrangement of the sliding-tube, ferrule, or waste-gate directly upon the hollow axle of the lower distributor, T, the same being for the purpose of regulating the head of water within the said distributor. I am aware that it is not unusual in gold-washers to use a suc-

cession of baths; therefore I do not claim such arrangement in general. But I also claim arranging the secondary mercury bath concentric with and below the primary one, in such a manner that the currents of water, &c., return towards the centre of the apparatus, thereby saving room, and causing the said currents to pass more slowly.

WM. BALL.

No. 8345.—*Improvements in Equalizing, or Power Regulators.*

I will proceed distinctly to state that I do not claim the mere employment as an "equalizer" or regulator of a piston operated by and acting against pressure, alternately, each stroke, the said piston having two strokes for one of the engine, or other mover it works in connexion with, as such has already been done; nor do I claim separately exposing the equalizer piston to the vacuum of the condenser. But what I do claim as my invention, and desire to secure by letters patent, is the use of steam or other gas to operate upon the piston of the power regulator, or "equalizer," the said steam or gas being derived from the same reservoir that supplies the engine.

ALFRED GREGORY.

No. 8346.—*Improvement in Sword Canes.*

What I claim as my invention, and desire to secure by letters patent, is a sword-cane, constructed substantially as herein set forth, viz: consisting of the rod, with blade attached, passing through the entire shaft, and giving point beyond it, whether the said rod be, or be not, connected with a spiral spring to draw the blade back into the handle.

I do not claim the application of the spiral spring as an adjusting power, nor do I claim the screw applied as a stop; neither of which being substantially new.

SAMUEL ADAMS HUDSON.

No. 8347.—*Improvement in Washing Machines.*

What I claim as my invention, and desire to secure by letters patent, is the combination, substantially as described, of the levers, link bar, and rubbing board, for the purposes herein specified.

ERASTUS LAWRENCE.

No. 8348.—*Improvement in Axles of Wheeled Cultivating Ploughs.*

What I claim as my invention, and desire to secure by letters patent, is hanging one or both of the axles of the wheels to the carriages of cultivator, gangs of ploughs, seed drills, &c., to the frame of the carriage, so as to vibrate the axle or axles, or suffer them to vibrate and keep them at right angles to the motion of the ploughs when moving in a direct line, and, when turning the ploughs, to keep the axle or axles in the direction of the radius of the circle, or nearly parallel with the radius of the circle, formed by the track of the wheel turning upon said axle,

when the ploughs constituting the gang are placed diagonally, one behind the other in succession, and the wheels to the carriage of the same are also placed diagonally, one behind the other.

G. W. C. GILLESPIE.

No. 8349.—*Improvement in Type-casting Machines.*

Having now described my invention, and the operation of the same, I will proceed to set forth what I claim, and desire to secure by letters patent. What I claim, is—

First. The employment of the lever, P, having an adjusting slot, adjuster, R, matrix spring-holder, O, and their combination with the horizontal slide, D, slide ways, H, H², and matrix spring, N, substantially in form and manner and for the purposes herein set forth.

I claim also the employment of the adjusting supporting piece, L, and the combination therewith of the horizontal slide, and levers, K, J, and M, substantially in form and manner and for the purposes herein described.

And I also claim the combination and arrangement of the horizontal slide ways, and levers operated thereby, for the purpose of obtaining a horizontal and oblique action of the machine.

JOHN J. STURGIS.

No. 8350.—*Improvement in Piano Forte Actions.*

What I claim as my invention, and desire to secure by letters patent, is the repeating check or tongue, connected with a lever, hinged to the hammer rail, and resting on the key, the under side of the hammer being provided with an arm, which rests against the upper end of the face of the repeating checks, substantially as and for the purpose specified.

RANDOLPH KRETER.

No. 8351.—*Improvement in Dental Forceps.*

What I claim as my invention, and desire to secure by letters patent, is the "compound lever forceps" above described, or the compound lever and the movable fulcrum applied to forceps, by means of which the roots of decayed or broken teeth may be readily and easily reached and extracted.

J. C. BURCH.

No. 8352.—*Improvement in Piano Forte Action.*

What I claim as my invention, and desire to secure by letters patent, is in having the shoulder under which the hopper plays attached to the hammer but by a centre pin, forming an independent oscillating shoulder to the hammer but, said shoulder being usually detached from the hammer but, or composing a part of it.

I also claim the extension of the back part of the shoulder down, so as to connect with a spring.

JAMES A. GRAY.

No. 8353.—*Improvement in Piano Forte Action.*

What I claim as my invention, and desire to secure by letters patent, is the jack, consisting of a crooked lever, and a straight, or nearly straight lifter, or pusher, acting conjointly on the general principle above illustrated.

And I also claim, and desire to secure, the peculiar application of the spring to govern the alternate bending and straightening of the jack, by acting one prong or tooth, between two other prongs or teeth, with due allowance of play, or shake, according to the desired degree of drop of the hammer from the string, known as the scrape.

R. M. KERRISON.

No. 8354.—*Improvement in fastening Hooks and Eyes to Paper Cards.*

I claim nothing for the machinery with which the work is done, nor for the mortise-like holes which belong to Atwood's patent; but what I do claim as my invention, and desire to secure by letters patent, is the confining of the eye by means of the longitudinal cut or slit, or cuts or slits, (whether one or more is used,) in the card, parallel with the rows of holes, admitting through it or them a portion of the eye, as herein described and applied, or in any manner substantially the same.

CHESTER J. CARRINGTON.

No. 8355.—*Improvement in Gauges used in Turning.*

What I claim as my invention, and desire to secure by letters patent, is the gauge, (c,) with its graduated slide, (c,) capable of being set to any given diameter, the whole being suspended upon a horizontal wire, operating as herein set forth.

C. R. HURLBUT.

No. 8356.—*Improvement in the manufacture of Paints.*

What I claim as my invention, and desire to secure by letters patent, is the manufacture, by the processes substantially as herein described, of new colors fit for painting, whether with oil, varnish, spirits of turpentine, or water, by means of the deoxidation of the soluble metallic sulphates of zinc, copper, iron, and other metals, and by the precipitation of their basis, either by alkaline hydro-sulphurets whose sulphates are soluble, such as those of soda, potash, and ammonia, to obtain colors with a single metallic base, or to obtain colors with a double base, partly metal and partly alkaline sulphate, by using the alkaline hydro-sulphurets whose sulphates are insoluble, such as those of baryta, strontian, and of lime, and even by the hydrated sulphurets and poly-sulphurets of lime prepared directly, substantially as herein set forth.

G. F. DE DOUHET.

No. 8357.—*Improvement in the manufacture of Iron.*

Having thus fully described the nature of my invention, what I claim as new therein, and desire to secure by letters patent, is the application

of franklinite to the improvement of iron in the processes of reduction from its ores, and in the finery or puddling of crude or pig iron, according to the methods, as above described.

S. T. JONES.

No. 8358.—*Improvement in Bedsteads.*

What I claim as my improvement is the suspension spring or strip, *d*, the thrust spring, *a*, and the spring, *e*, between them, as combined or applied together, and to the bedstead and slats imposed upon them, substantially as hereinbefore specified.

IRA RUSSEL.

No. 8359.—*Improvement in Railroad Car Coupling.*

What I claim as my invention, and desire to secure by letters patent, is the shape and construction of the improved car platform, in combination with the jointed self-acting pin, stationary pin, and grooved half coupling, all as herein described, for the purpose of coupling and disconnecting cars.

GEORGE WINTERS.

No. 8360.—*Improvement in Machines for breaking Hemp and Flax, and reducing the length of the fibres.*

Having thus fully described our invention, what we claim therein, and desire to secure by letters patent, is the art or method of separating the fibres of flax, hemp, &c., from the boon, and reducing them to suitable length of staple to be used on cotton, woollen, and other machinery by the use of combined sets of grooved and graduated rollers, or their equivalents, operating in the manner and for the purpose herein fully set forth and represented.

JAMES S. TREAT,
STEPHEN RANDALL.

No. 8361.—*Gauge for indicating Pressure of Steam, &c.*

What I claim as my invention, and desire to secure by letters patent, is combining with the steam tube the disk and spring, so arranged that the force of the current of steam impinging upon said disk can be ascertained by the extent to which the spring is expanded, and this can be known by the comparative pressure in the boiler or other vessel necessary to give the required velocity to the current to produce different degrees of expansion of the springs, substantially as herein set forth.

GEORGE FABER.

No. 8362.—*Improvement in Apparatus for Draining Sugar.*

What I claim as my invention, and desire to secure by letters patent, is combining two or more straining pans with molasses or receiving vessels, below each, substantially as described, the said pans being provided with a discharge pipe or tube, substantially as described, so that the current of air shall pass from the lower part of the first to the upper

part of the next through the series, and so arranged as to retain the molasses or other liquid parts; and this combination I claim, whether the said succession of pans be used in one or more series, as described.

SMITH GARDNER.

No. 8363.—*Improvement in Stone Drilling Machines.*

Having thus described my new drilling machine, I shall state my claim as follows: What I claim as my invention, and desire to have secured to me by letters patent, is—

First. A power drilling machine, in which the drill is driven by a vibrating hammer, operated substantially as hereinabove described.

Second. I claim stopping the “feeding forward” of the sliding frame and drill, when the latter does not penetrate the rock sufficiently, or to the usual depth at each blow, by keeping the pawl out of the feeding ratchet, excepting when the drill goes in the requisite length, by means of the combination of the forked vertical lever, c' , d' , connected with the drill shaft, the horizontal lever, a' , a' , a' , and the spiral spring, h' , h' , operating substantially as hereinabove set forth.

I also claim drawing the edge of the drill away from the bottom of the hole, when the tool is being turned, by means of the inclined claw or fork, l' , operating with a collar, n' , on said drill, substantially as hereinabove described.

HENRY GOULDING.

No. 8364.—*Improvement in Machines for dressing Mill Stones.*

We claim, in combination with the feed lever, (e') operated by the cam, (d') to work the feed bands, the employment of a weighted stop lever, or the equivalent thereof, acting in the notch, (m') of the lever, (e') substantially as described, which said stop shall be self-acting, to stop the feed motion, that the cuts may continue in the same place until the feed motion is restarted and thus insure the cutting of the stone to the required depth, whatever may be the texture thereof, as described.

ERASTUS W. HAZARD,
CHARLES H. JENNER.

No. 8365.—*Improvement in processes of making Bronze Powder.*

What I claim as my invention is making metallic bronze powder of copper, tin, spelter, or their alloys, by running them through iron or steel rollers, substantially as described; also the application, and manner of application, of soap, to make the bronze bright, and brilliant, and durable.

L. BRANDEIS.

No. 8366.—*Improvement in Stoves.*

Having thus described my improvements, I shall state my claims as follow: What I claim as my invention, and desire to have secured to me by letters patent, is forming the tapering radiator, produced by extending the fire chamber, as above set forth, in branches arranged with their

centre lines, parallel to each other, or nearly so, and connected by arches, substantially in the manner above set forth.

GARDNER CHILSON.

No. 8367.—*Improved Bench Vise.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the latch pin, the ratch bar, acted upon by a spring that constantly tends to disengage it from the latch pin, and the foot lever, with the movable jaw of a vise; these several parts being constructed, arranged, and operating as herein set forth.

N. F. CONE.

No. 8368.—*Improvement in Weavers' Temples.*

What I claim as my invention, and desire to secure by letters patent, is connecting the movable jaw to its point of suspension by an arm, or equivalent, in such a manner that the point of suspension will be nearer the middle of the cloth than its other extremity, which extends out towards or beyond the selvage at such an angle that the jaws of the temple will be released by the cloth as it is spread by the action of the reed upon the warp, when it strikes up a thread of weft, and closed by the contraction of the cloth, caused by its own elasticity, as the reed leaves it, so that the cloth, by its own action, is released, when the reed advances, and is griped and held as it recedes, thereby dispensing with the strong spring wedge and other devices heretofore used for operating the jaws of temples.

ARNOLD JILLSON.

No. 8369.—*Improvement in Leather-Splitting Machines.*

Having thus described my improved leather-splitting machine, I shall state my claims as follow: What I claim as my invention, and desire to have secured to me by letters patent, is—

First. Making the gauge-roller of a leather-splitting machine, with the sectional tubes or friction rollers, to be placed on each end thereof, substantially as herein above set forth, and for the purpose specified.

Second. I claim combining with the ordinary cast-iron spring plate of a leather-splitting machine a cast steel spring plate, forming a double lip spring plate, and fitted thereon so as to be adjustable horizontally, as herein above set forth; and so that the front edge of the lower or cast iron plate may project under the edge of the knife, and hold up the split, as hereinabove set forth.

ALPHA RICHARDSON.

No. 8370.—*Improvement in Fastenings for Last Blocks.*

Having thus described my improvement, I shall state my claim as follows: What I claim as my invention, and desire to have secured to me by letters patent, is fastening the block to a boot or shoe last by a hasp on said block, in combination with a spring attached to the last, as hereinabove described, or in any other manner substantially the same.

LEVI R. ROCKWOOD.

No. 8371.—*Improvement in Waste Pickers.*

Having thus described our improved machine, we shall state our claim, as follows: What we claim as our invention, and desire to have secured to us by letters patent, is the use of a blast of steam or air passing into and out of the hollow shell, as hereinabove specified, so as to blow the ends or fibres of the material out, in order to enable the teeth of the picking cylinder to engage with them.

CHAS. G. SARGENT,
ROBERT THOMPSON.

No. 8372.—*Improvement in Machines for printing House Papers.*

Having thus described my improvements in house paper printing machinery, I shall state my claims as follow: What I claim as my invention, and desire to have secured to me by letters patent, is the use of two sets of spur clamps—one set being sliding and feeding clamps, and the other set being stationary and holding clamps, and the two sets having a connected operation, so that one set shall be open when the other set is closed; all as hereinabove set forth.

I also claim the mode, hereinabove described, for supplying the coloring fluid to the patterns—that is, by means of a cloth band, alternately drawn forward from the vat over an elastic bed, on which the platen descends, and then back again through the color in the said vat; all as hereinabove set forth.

I also claim giving the second or double application of the color to the patterns, for each impression, by suddenly lowering the elastic bed after the first touch of the patterns on the cloth band, and then raising it again for the second touch, substantially in the manner hereinabove set forth.

MILTON D. WHIPPLE.

No. 8373.—*Improvement in Churns.*

Having thus described my invention, I will now state what I claim, and desire to secure by letters patent:

First. I claim the employment of a revolving vessel, A, containing the cream or milk, with or without cleats, *d, d, d, d*, constructed either plain or with pins, *e, e, e, e*, or having any other suitable internal projections, and operating in combination with a toothed or plain stationary cross-bar, F, removably or permanently secured to the fixed axles, B, B, and situated in the space forming the upper half of the vessel, A, at any desired distance from the centre thereof.

Second. I likewise claim the employment of a tempering cylinder, K, and tubes, L¹, L², in combination with the revolving vessel, A, and cross-bar, F, for cooling or warming and agitating the milk, by its precipitation thereon, as caused by the circular motion conveyed to the milk, and interruption or arresting effect produced, substantially as shown and described.

GEO. B. CLARKE.

No. 8374.—*Improvements in Machines for scutching and hackling Hemp and Flax.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the method herein described, or any other means essentially the same, of throwing the teeth in and out of the cylinder or drum at pleasure, whilst in motion, so as to present a greater or less length of teeth to the hemp, or of drawing them entirely within the cylinder in case the hemp should become entangled and likely to break up the machine.

Second. I claim, in combination with the bar holding the teeth, the spiral spring for allowing said bar to yield to knots, or other obstructions, and for drawing back into proper position the said bar after it is released from said obstruction.

Third. I claim, in combination with the bar and teeth, arranged as herein described, the adjustable guides, S, for setting the teeth at such angle as will give them more or less hold upon the hemp, as herein fully described and represented.

OWEN W. GRIMES.

No. 8375.—*Improvement in Machines for stripping Seed from Broom Corn.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the endless bearded belt, D, D, constructed of any proper material, and having "lugs" or spikes, G, G, as described, in combination with the comb-rollers, B, B, set diagonally upon the frame, A, A, A, in the manner and for the purposes substantially as set forth.

L. D. GROSVENOR.

No. 8376.—*Improvements in Lath Machines.*

Having thus fully described my invention for sawing laths, I desire it to be understood that I do not claim mounting a rotary cutter, C, on the same spindle of the rotary saw, as herein described; nor do I claim the returning table, consisting of a series of rollers, G, G, G, arranged and operated in the manner described; but what I do claim, and desire to secure by letters patent, is the director, J, and carrying belt, in combination with the apparatus for registering, substantially such as described, for delivering bundles ready counted.

I also claim the rounded surface of the receiving table, in conjunction with the bent form of the strip, J, as represented in figure 2, at (k,) which effects, in the simplest manner, the delivery on the returning rollers, G, G, G, of the unsawed slab to the attendant, for another cut.

WILLIAM MERRILL.

No. 8377.—*Improvement in Easy Chairs for Invalids, &c.*

Having described the construction and uses of my adjustable combination chair, what I claim therein as new, and desire to secure by letters patent, is the manner of combining the jointed chair with the jointed

ottomans, whereby the whole is made to subserve the several purposes hereinbefore described, and illustrated in the drawings.

I also claim furnishing the back of the chair with an additional joint, F², whereby the back of the chair is rendered susceptible of such adjustment as to form a support to the spine of the occupant of the chair, as described and shown in the drawings.

I likewise claim the employment of the triple-jointed hinges, K, K, in combination with the spiral springs, L, L, for securing the flexible bolster, J, by which it is steadied and retained in its proper position when expanded or contracted, as set forth.

PATRICK O. NEIL.

No. 8378.—*Improvement in Ventilating Ships.*

We do not claim to have invented either the caboose water back, ventiducts, or valves, although we do not know of the several parts referred to having been used for the purpose described. But what we do claim as our joint invention is the combination and application of the caboose water back, ventiducts, and valves, in connexion with our water surface and the cowl and vane, for the introduction of pure air, and the expelling of impure air, as described, and for the purpose hereinbefore mentioned.

AMOS J. SEXTON,
WILLIAM ENNIS.

No. 8379.—*Improvement in Machinery for threading Wood Screws, and Feed Apparatus therefor.*

Having thus described the principle, or mode of operation, of my said improvements, and the manner of constructing and working the same, together with old parts, so far as it was necessary to describe these latter, what I claim as my invention, and desire to secure by letters patent, is the employment of two cams in combination, substantially as described, for the purpose of operating the fingers which supply and present the blanks to the gripping jaws, as described.

I also claim the employment of one cutter, to form the thread on the conical point, when combined and operating simultaneously with a second cutter, for forming the thread on the main part of the shank, substantially as described, and for the end specified, provided the motion of one of the cutters is extended into the track of the other, to insure the making of the thread on the conical point a continuation of the thread on the main part of the shank.

THOS. J. SLOAN.

No. 8380.—*Engine in which Compressed Air, or other Gas, heated and expanded by admixture therewith of a heated fluid, is used as the Motive Agent.*

Having thus fully described the nature of my invention, what I claim, and desire to secure by letters patent of the United States, is actuating an engine, such as are now usually driven by steam, or of any convenient form, by means of a measured or detailed quantity of air, pre-

viously compressed, and having had its tension, due to such compression, highly increased and augmented by the jetting, or flashing into, or commixture with it of a measured or detailed quantity of a "medium," or, in other words, of a heated liquid, as water, or a vapor, (simple or "superheated,") as steam, said jetting of the steam into the air, (or *vice versa*, the air into the steam, which I claim as equivalent,) and their commixture being effected in a vessel or vessels disconnected, previous to and during that process, or at least prior to its final consummation, from the reservoir, or main source of compressed air, and from that of the steam, &c., and each separate and distinct charge, or detailed quantity of compressed air, heated by its corresponding charge, or detailed quantity of steam, being allowed to act upon the piston, or its equivalent, prior to the admission or introduction of another charge of air and steam into the vessel or vessels in which their commixture is effected; the whole operation being carried out by means of mechanism, in substance such as here represented, or any more fitting mechanism that shall effect the same in the manner here claimed.

WM. MT. STORM.

No. 8381.—*Improvement in Shoe Latchets.*

What I claim as my invention, and desire to secure by letters patent, is the confining a shoe to the foot by means of a flexible latch, B, secured to one portion of the said shoe, acting in conjunction with a socket, or eyelet, d, and a catch, or hook, c, secured to other parts of the shoe, and operating substantially in the manner herein set forth.

ISAAC BANISTER.

No. 8382.—*Improvement in the Churn and Butter Worker.*

I am aware that, in some respects, it resembles some other machines or engines for such purpose, but still such parts as constitute such resemblances form no portion of my invention or improvements, and what I claim, which are as follow:

That is to say, I claim the combination of one or more fluted rollers, R, S, with one or more floats, i, k, to operate so as not only to aid in the process of separating the butter from the cream, but afterwards, and when the motion of the dasher is reversed, to throw into ridges the butter spread on the bottom of the floats.

And I claim the improvement of giving a longitudinal hollow or curve to the external surface of each float, i, k, for the purpose of gathering the spread butter towards its middle, and preventing the butter from adhering to the ends of the reservoir, as specified.

ASA WILLARD.

No. 8383.—*Improvement in Piano Fortes.*

Having thus described my improvements, I shall state my claim as follows:

What I claim as my invention, and desire to have secured to me by letters patent, is—

First. Arranging the sounding board in a springing form, and supporting its back on a straining lever, made to bear with more or less force against it, in the manner and for the purpose hereinabove specified.

Second. I claim the combination of the short subsidiary iron frame, having a rectangular socket on its front rail, with the long main iron frame, having a wooden block on the under side of its front rail, which fits and is glued into the aforesaid socket, as hereinbefore set forth.

Third. I claim casting the bridge of the long iron frame with curved brackets, so as to have it raised above the level of the bottom of the front rail of said frame, and permit the strings to be strained or strung under the same, as hereinabove explained.

Fourth. I claim easing the escapement of the fly of the jack from under the centre block of the hammer by means of a spring, combined with said block and the stem of the hammer, as hereinabove stated.

Fifth. I claim arranging the back catch on a lever, having a fulcrum in the jack, and arranged so as to cause the catch to follow the hammer in a stroke of the same, and cause it to repeat the stroke or note, if desired, when the fly of the jack fails to operate, so as to effect said second stroke.

Sixth. I claim using a piece of gutta percha on the top of the hammer head, in lieu of some of the layers of leather, in the manner and for the purpose specified.

LOUIS H. BROWNE.

No. 8384.—*Improvement in Letter Stamps.*

I do not claim punching out types from a cavity by a follower ; but what I do claim as my invention, and desire to secure by letters patent, is so making and operating the detruding rods or followers of a letter stamp so as to act wholly within the body of the stamp block, whereby I avoid cutting away the handle, and the weakening which would be caused thereby.

I also claim making the detruding rod, R, wing, N, and thumb slide, O, in a single piece, whereby I greatly economize the labor of making this part of the stamp, as herein set forth.

B. CHAMBERS.

No. 8385.—*Improvement in Mowing Machines and Harvesters.*

What I claim as my invention, and desire to secure by letters patent, is hanging the cutter bar of a reaping machine to the side of a triangular frame in such manner that neither extremity of the cutter shall be liable to sag below the other extremity, as herein set forth.

JOHN H. MANNY.

No. 8386.—*Improvement in Printing Presses.*

It must also be understood that I do not claim individually or separately any of the parts of the apparatus or machinery ; but what I do claim as my invention, and what I desire to secure by letters patent, is—

First. In combination with the ink troughs, E, and printing cylinders, A, the arrangement of the cam cylinders, D, reciprocating cylin-

ders, K, (operated by the levers, J,) and L, (operated by the levers, M,) and cylinders, G and N, for receiving, carrying, and distributing the ink from the said trough to the said cylinder.

Second. I claim, in combination with the printing cylinders, the cylinders, O, P, provided with a spring knife or saw, Q, operated by cams, R, and also with alternate ribs or projections and grooves, for the purpose of nearly severing the filaments of the paper as it passes through between said rollers, and for the purpose also of creasing the paper for the more easily folding of it.

Third. I claim, in combination with the partially cutting and creasing cylinders, O, P, the different-sized cylinders, C, D, geared together for the purpose of tearing apart the partially cut paper, the cylinders, C, holding, and the increased motion of the cylinders, D, at their periphery (they being the larger) drawing the paper sufficiently to separate it.

Fourth. I claim, in combination with the separating cylinders, C, D, the tunnel, G, for guiding, and the wheel, E, divided into a suitable number of compartments, for receiving the sheets as they are delivered from the machine; the whole being constructed substantially as herein described, and for the purposes fully set forth.

JACOB WORMS.

No. 8387.—*Blind or Shutter Fasteners.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the fast and free hooks with the inner plate, the same being arranged, as herein set forth, in such manner that the fast hook forms the pivot for the free one, and the two are connected to the inner plate in such manner that the movement, breakage, or removal of the free hook does not affect the security of the fastening, while, at the same time, the two hooks are secured to the inner plate by the fastening of the latter to the shutter.

WASHBURN RACE.

No. 8388.—*Improvement in Hand Stamps.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is securing the plate of a hand-stamp to the shank or handle, by means of a universal ball and socket, or other joint, so as to allow the stamp to make a fair impression at whatever angle it may strike the material to be stamped, as herein fully set forth and explained.

STEPHEN P. RUGGLES.

No. 8389.—*Improvement in Piano Fortes.*

What I claim as my invention is the combination of the return screw, S, and button, T, or equivalent contrivance or contrivances, with the hammer and fly, and its retractive spring, so as to operate in manner, and in connexion with the same and other parts, substantially as herein described.

TIMOTHY GILBERT.

No. 8390.—*Improvement in Weavers' Shuttles.*

What I claim as my invention, and desire to secure by letters patent, is making the spindle and spring both in one piece, by extending the spindle behind the hole, for the pin that fastens it into the shuttle, and reducing it to a proper thickness, and bending it to form the spring required to hold the spindle in its proper positions in the shuttle, either with or without the catch on the end of the spring, in combination with the pin, D, or its equivalent, against which the spring acts to hold the spindles in the different positions required, substantially as described, thereby avoiding the inconvenience arising from the loosening of the screw which holds the spring in other shuttles, and saving the additional labor required to fit it in when the spring is made separate from the spindle.

LAROE LITCHFIELD.

No. 8391.—*Improvement in Weighing Carts.*

Having thus fully, clearly, and exactly described the nature, construction, and operation of my improved weighing car, what I claim therein as new, and desire to secure by letters patent, is the construction and arrangement, substantially as described, by which a weighing apparatus is capacitated for easy removal from place to place, by the adaptation to each other of the containing and weighing apparatus and of the running gear—that is to say, by making the fulcrum (*i*) for the lever or weighing beam (*h, h'*) upon the axle near the wheel, the arm with its sliding weight lying upon the pole or tongue, (*l*), and the axle affording, by its bent form, free egress to the contents of the box when discharged by means of the valve.

N. B. LIVINGSTON.

No. 8392.—*Improvement in Self-acting Presses.*

Having thus described the construction of my press, I desire it to be understood that I do not claim either the cams or the temple-joint, when used singly; but what I claim as new, and desire to secure by letters patent, is the combination of the eccentric cams, rolling on each other, so as to avoid friction in connexion with the braces or temple-joint, as above described, for the purpose and substantially in the manner aforesaid.

WM. MOORE.

No. 8393.—*Improvement in Saws for sawing and smoothing Boards.*

I claim, for the purposes above set forth, forming and arranging teeth of saws, substantially as herein described.

GEORGE F. WOOLSTEN.

No. 8394.—*Improvement in Instruments for the cure of Stammering.*

Having thus fully described my instruments for the cure of stammering, and their application and method of use, what I claim as my invention, and desire to secure by letters patent, is—

First. The employment of a tube in the mouth, which will admit of

speaking, and of the passage of air, when either the tongue or lips would prevent the passage of air, substantially as hereinabove set forth.

Second. The employment of the adjustable spring pad, substantially as hereinabove set forth.

Third. The joint employment of the mouth tube and the adjustable spring pad, at the same time curing the guttural, lingual, and labial disease of stammering, substantially as hereinabove set forth.

ROBERT BATES.

No. 8395.—*Machine for making Wheel Tires.*

What I desire to claim, and secure by letters patent, is the combination of the upper and lower dies with the welders, receiving motion from wedges attached to the upper and falling die, the whole acting to shape a tire on all parts of its surface at the same time, substantially as described in the within specification.

MARIA VAUGHN.

No. 8396.—*Improved Maze Lock.*

What I claim as my invention, and desire to secure by letters patent, is the disk, D, with its concentric and radial passages, or their equivalents, in combination with the bolt end, o, operated substantially in the manner and for the purposes herein described.

THOMAS NICHOLSON.

No. 8397.—*Machine for arranging Screw Blanks and articles of a similar character.*

Having thus described the principle, or mode of operation, of my said invention, and the manner of constructing and using the same, I wish it to be distinctly understood that I do not limit myself to the precise mode of construction and arrangement specified, as these may be varied without changing the character of my invention.

What I claim as new, and desire to secure by letters patent, is the combination of the inclined ways, substantially such as herein described, with a trough, substantially such as described, and provided with a pin or pins, or their equivalent, as described, so that, by the motion of the trough towards the ways, or *vice versa*, the screws or other articles will be forced up the inclined ways, hanging by their heads, as described.

THOS. J. SLOAN.

No. 8398.—*Improvement in Plotting Scales.*

What I claim to be my invention, and desire to secure by letters patent, is not the division into equal parts, with or without subdivisions of one or more of those parts, of the continuous edge of a scale or rule, nor the use of a vernier for measuring or describing right lines, nor the manner of attaching the vernier-slide to the main plate of the instrument, nor the use of a lever or slow motion screw, for adjusting the motions of the vernier-slide; but the combined application in one and the same instrument of the graduation upon the edge, (to obviate the im

fection and inconvenience attending the use of dividers or compasses,) and the slide carrying with it the several primary divisions of the unit, and those divisions carrying with them, respectively, by means of the vernier, the several secondary divisions into hundredths, or otherwise, so as to enable the operator to distinguish and apply hundredths, or half-hundredths of the smallest unit, with a great rapidity, precision, and ease, as tenths of the same unit, with the scale graduated on the edge, without a slide; and so, likewise, that whatever parts of a unit are required, or whatever the whole length of line to be measured, the whole amount of motion required in lengthening or shortening the instrument is only equal to the number of additional or intermediate hundredths, or other subdivisions, never exceeding one-tenth of the unit of measure.

LEMUEL H. PARSONS.

No. 8399.—*Improvement in Fountain Pens.*

What I claim as my invention is the improvement of the hollow flexible, and long extension of the reservoir or tube, as seen at *g*, to extend up and be secured to the arm of the writer, substantially in manner and for the purpose as specified.

NEWELL A. PRINCE.

No. 8400.—*Improvements in Machines for sawing Volutes.*

I do not claim the carriage, *D*, for carriages have been, and are now, applied to saw mills; but what I do claim as new, and desire to secure by letters patent, is—

First. The manner in which I produce the two motions necessary to be given to the block, in order that it may be sawed in the required form, viz: the screw rod, *F*, with its right and left screws cut upon it, mashing into the pinions, *t*, *t'*, by which motion is communicated to the horizontal rods, *G*, *G'*, the toothed wheels, pinions, or spurs, *u*, *u'*, grasping the edge of the block, and causing it to rotate, in combination with the bevel pinions, *l*, *m*, screw rods, *k*, and arm, *o*, by which a rectilinear motion towards the saw is given, the carriage and block producing the result described.

ELIJAH WHITEN.

No. 8401.—*Improvement in Mitre Boxes.*

What I claim is one or two rotary saw guides, *A*, *B*, with sliding gauge rests, *N*, *N*, &c., and mechanism for rotating the guides, and fixing them in any desirable position, or positions, as specified, in combination with the improvement of making or applying the uprights, *c*, *d*, *e*, *f*, &c., or vertical supports of the saw to the bars, *a*, *b*, so as to be capable of being turned down to an angle with the horizon, for the purpose as described.

MATTHEW SPEAR.

No. 8402.—*Improvement in Shields for Valves.*

What I claim, and desire letters patent for, is surrounding the valve by a shield, constructed substantially in the manner as herein described

and set forth, and fitting closely enough to regulate the ingress and egress of the water or steam, to such a degree as to prevent the slamming of the valve in opening and closing.

ALEXANDER JIMASON.

No. 8403.—*Improvement in the manufacture of Clay Pipes.*

Having thus described my improvements in apparatus for moulding clay pipes, I shall state my claim as follows: What I claim as my invention, and desire to have secured to me by letters patent, is the use of the wire gauge frame, constructed substantially as above described, in moulding clay or earthen pipes, in the manner and for the purpose above specified.

I also claim the improvement above specified in the sack in which said pipes are suspended to be dried, said improvement consisting in confining said sack to two rails, kept parallel by means of cross bars, forming with them a rectangular frame, as hereinabove described.

JOSEPH PUTNAM.

No. 8404.—*Improvement in Machines for opening and cleaning Flocks.*

Having thus described the nature of my invention, what I claim as new, and desire to secure by letters patent, is the arrangement and combination of the conical revolving grater within the close grater case, combined with the blowers, in the manner and for the purpose substantially the same as described and represented.

EPHRAIM C. BRETT.

No. 8405.—*Improvements in apparatus for Applying flocks to Cloth.*

Having thus described the nature and operation of our invention, what we claim as new, and desire to secure by letters patent, is the revolving screen, D, having a beater within it on a shaft, E, as described, in combination with the corrugated rollers, B, B, B', constructed and operating in the manner and for the purpose substantially as set forth.

DANIEL PRATT,
RANSOM PRATT.

No. 8406.—*Improvement in Tanning.*

What I claim as my invention or discovery, as a new and useful improvement, and desire to secure by letters patent, is the use of arsenic or arsenic acid, substantially in the manner and for the purposes herein set forth; the peculiar properties of arsenic, by which it tends to suspend the natural tendency of the animal fibre to decomposition upon the extinction of animal life, are well known, and of course they are not patentable; but their application to the processes of tanning, and otherwise preparing skins and hides for useful purposes, by which they are rendered stronger and more durable, is believed not to have been heretofore known and used.

I do not, therefore, intend to limit my claim to any particular mode or period of using the article; but I shall apply it in such form, or in such

strength of solution, as the nature of the case may require, to effect the objects named. Workmen should guard against the absorption of the poisonous qualities of the arsenic, while immersing or handling the skins in the liquor, by using tools or wearing India rubber gloves. After the skins are taken out of the liquor and rinsed thoroughly, the danger ceases.

N. C. TOWLE.

No. 8407.—*Improvements in the Endless Chain Propeller.*

Having thus fully described my improvements in horizontal operating or endless chain propellers, I do not mean to claim the invention of the endless chain propeller, or the application of the endless chains to communicate power from one wheel to another; but what I do claim as new, and which I desire to secure by letters patent, is suspending the endless chain propeller, which is to be put in motion by an endless chain running on the side wheel on the principal drum under water, in a rigid frame inside of the water tight chamber, the frame being capable of an upward and downward motion, parallel to itself, by means of the four racks and pinions, or their equivalents, acted upon by gearing connected each to each, said frame being connected with an indicator, by which the situation of the propeller may be ascertained; the whole constructed substantially in the manner and for the purposes herein described.

Second. I claim the sliding lid to the aperture in the bottom of the vessel, through which the propeller projects when lowered for operation; but when the propeller is raised inside of the vessel, the lid closes the aperture, so that the speed of the vessel may not be impeded, when under sail alone, by the action of the water on the aperture in the bottom, said sliding lid being worked by a screw, or its equivalent, in connexion with an indicator, by which the position of the lid can be seen, substantially as herein described.

CHARLES F. FISHER.

No. 8408.—*Improvement in devices for sowing, in a Seed Planter.*

Having thus described the construction and operation of my drill, what I claim therein as new, and desire to secure by letters patent, is the novel manner of discharging the seed by the natural motion of the horse or animal, while in the act of walking and propelling the drill, without the aid of wheels, with the arrangement of levers, arms, &c., for discharging the seed, or their equivalents, operating in the manner and for the purpose herein fully set forth and represented.

W. P. CLEMENTS.

No. 8409.—*Improvement in Escapements for Time Pieces.*

What I claim, and that for which I respectfully pray a patent may be granted, is the combination of the pallets and lever or levers here set forth with the above-described mode of communicating impulse to the balance in time pieces which keep time by means of a balance.

JAMES FULTON.

No. 8410.—*Improvement in Running Gear of Locomotives.*

What I claim as my invention, and desire to secure by letters patent, is the manner of employing the unflanged driving wheels, A, connected and arranged as described, with the flanged truck wheels, D, at the forward end of the engine, in combination with the flanged driving wheels, B, for the purpose of increasing the traction or adhesion of the driving wheels to the rails for overcoming steep grades without increasing the weight of the engine.

JAMES H. MURRILL.

No. 8411.—*Improvements in Revolving Boilers.*

Having thus fully described the nature of my improvements in steam boilers, what I claim therein as new, and desire to secure by letters patent, is the combination of the small cylinders, (c, d,) provided with apertures and rims as described, with the distributing chambers, (f, f'); the whole revolving around a common axis, and operating substantially as described.

WILLIAM SCOTT.

No. 8412.—*Improvement in Revolving Breech Pistols.*

I do not claim to make the latch hook alone revolve on the barrel, but I claim the improvement of so connecting or combining the latch hook, the slide bearing of the rammer, and the lever with the barrel, by means of the swivel tube, or any analogous contrivance, as to enable them to be all simultaneously turned laterally, or revolve around the axis of the barrel, and thereby remove any obstruction to the elevation or upward movement of the barrel, such as may be necessary in order to effect the removal of the cylinder of charging chambers from the arbor on which it is supported.

JOSHUA STEVENS.

No. 8413.—*Improvement in Apparatus for warming Air and Water for Dwellings.*

What I claim as my invention, and desire to secure by letters patent, is the construction of a fire-proof apartment in houses, extending from the lowest extremity of the house to the roof, with furnaces at the bottom, the smoke pipes of other fires entering it, and winding along its walls to a chimney at the top, and with openings to let the heat in the apartment into the house, or up the chimney; and also for the construction of cisterns within the fire-proof apartments, with pipes as above described.

LE GRAND C. ST. JOHN.

No. 8414.—*Improvement in Machines for cutting Screws on Posts and Rails of Bedsteads.*

What I claim as my invention, and desire to secure by letters patent, is the trifurcated travellers, G, in combination with the right and left

screw axle, B, B, the carriage, H, saddles, I, hollow axle, *t*, and cutters, *c* and *v*, whereby the threads of two beam tenons and two sockets are cut by one and the same operation; the several devices being constructed and arranged in the manner and for the purposes herein set forth.

ORION THORNLEY.

No. 8415.—*Improvement in Portable Elevated Ovens.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement, as herein described, of the inner and outer concentric tubes with respect to the oven and pot hole, as described, whereby the oven is equally heated by a small fire, and the heat is directed by the inner upright pipe against the bottom of the kettle or other vessel; thus enabling the user to conduct simultaneously the several operations of baking and boiling with a small fire, and with economy of fuel.

PATRICK KILLIN.

No. 8416.—*Improvement in Machines for cutting Screws on Rails of Bedsteads.*

Having thus fully described the construction and operation of my hand implement for cutting right and left-handed screws on tenons of bedstead rails, what I claim as my invention, and desire to secure by letters patent, is—

First. In combination with the central screw shaft, D, through which the rotation of the cylinder, A, is effected, the hollow screw shaft, E, provided with an inverse and male screw thread and cylindrical case, F, having an inverse screw thread matching with the male screw thread of the hollow shaft, E; the whole being arranged as above set forth, and operated by means of the bolts, C and *b*, and cam, H, on the cross head, in such a manner as to feed the cylinder, A, frontward simultaneously with a right or leftward rotation thereof, as fully described and shown in the drawings.

Second. I also claim the employment of the screw shanks, J, J, provided with toothed wheels, K, K, made to match with toothed or ribbed plates, L, L, forming one of the sides of each box; the outer ends of said screw shanks, J, J, being confined in inverse screws, formed in plates *d*, *d*; whilst their inner or pointed ends are supported by plates, *k*, *k*, having projections *k*², *k*², against which the shoulder of the rail acts, for the purpose of actuating said screw shanks rotarily for imparting thereto a lateral movement, in such a manner as to cause their pointed ends to enter the rail, and be locked thereto by the spring levers, M; said screw shanks, J, being detached from the rail, when unlocked, by simply withdrawing the implement therefrom, as fully described and shown in figs. 2 and 3.

Third. I further claim the employment of the semi-circular plate, O, of the cross head, *c*, in combination with the spring levers, M, M, for the purpose of actuating said spring levers, M, in locking and unlocking the plates, *k*, *k*, of the screw shanks, J, J, at the terminus of the receding movement of the cylinder, A, whether cutting the right or left screw, as described and represented.

Fourth. I also claim confining each V-shaped cutter, P, to the reversible cylinder, A, by means of the segmental brace plate, R, notched at one end, so as to interlock with the end of the shank of the cutter, projecting through an opening, S³, in the cylinder, whilst its opposite end is made to fit against the frontward portion of the cutter, at S², said segmental brace-plate, R, being secured by means of a screw bolt, s, passing through it and the cylinder, and pressing upon the shank of the cutter, P, in such a manner as to form a complete lock thereto; there being a binding pressure at four points upon the cutter, viz: at either extremity thereof, at the connexion of the brace-plate, R, with the frontward end of the cutter, and the centre, by the confining screw bolt S, thus rendering it impossible to move the cutter without fracturing the segmental brace-plate, R, and displacing the screw bolts, S, as described and represented.

S. LEWIS.

No. 8417.—*Improvements in Locomotives moved by the power of Animals.*

Having thus described my apparatus for applying the force exerted by animals to the purposes of locomotion, what I claim therein as new, and desire to secure by letters patent, is—

First. The combination with the endless platform of an adjusting apparatus, by means of which the inclination of the platform to the frame of the power carriage may be varied, to enable the horses to work to the least advantage, whether to accelerate or to retard the movement of the impulsoria in traversing ascending or descending grades.

Second. I also claim the method of connecting the frame of the impulsoria with the pilot by means of a longitudinal shaft, which is fitted with mechanism, by means of which the impulsoria can be adjusted, transversely, to keep the driving axle level, and to prevent the endless platform from sloping crosswise when traversing a road, one of whose sides is higher than the other.

And, lastly, I claim, in an apparatus adapted to propulsion by animals, substantially as herein described, the employment of a single driving wheel, arranged in such manner as to admit of being leaned toward the hill, in travelling across slopes, to prevent a transverse sloping of the endless platform, in which the animals walk when the wheel thus arranged is steadied by a pilot before and a follower behind, or their equivalent, substantially as herein set forth.

CLEMENT MASSERANO.

No. 8418.—*Improvement in Insulators for Telegraph Wires.*

What I claim, and desire to secure by letters patent, is the re entering angle, at or near the base of the cup, as described, for the purpose of giving the wind a direction downwards, thereby preventing the rain that is driven by the wind from entering the cavity of the cup.

I also claim the annular disk, or washer, supported upon the centre shank or rod, and so placed within or at the open or lower end of the inverted cup as to prevent the free access of wind and rain to the inside of the the cup.

I do not claim the mode of embedding the shank in glass cast around it; but I do claim the application of the enamel, or glazing of porcelain, glass, or other vitrified, non-conducting material, to a surface of metal, when the same is used for insulating the wires of the electric telegraph.

JOHN MONTGOMERY BATCHELDER.

No. 8419.—*Improvement in Insulators for Telegraph Wires.*

What I claim as my invention, and desire to secure by letters patent, is my improved insulating supporter for telegraphic wires, composed of the supporting and protecting cover, A, the winged tube, B, the wire holder, C, and the insulating segments, *d, d*, arranged and combined with each other substantially in the manner herein represented and described.

Z. C. ROBBINS.

No. 8420.—*Improvement in Imitating Marble.*

What I claim as my invention is the process, substantially as described, of preparing and applying colors to glass, or other suitable transparent medium, so as to imitate the varied or colored appearance of polished marble or other mineral.

HIRAM TUCKER.

No. 8421.—*Improvement in Shower Baths.*

What I claim as my invention, and desire to secure by letters patent, is the manner of hitching and unhitching the bath, for the purpose of suspending it when raised, and lowering it when desired, by means of the hooks, L, P, in combination with the looped strap, I, carrying a pulley, K, arranged and operating in connexion with another pulley, M, substantially as shown and described.

WM. H. BROWN.

No. 8422.—*Improvements in Machines for Cutting Corks.*

Having thus fully described my improved cork-cutting machine, what I claim therein as new, and for which I desire to secure letters patent, is the cylindrical crown cutters, substantially as herein described, formed of an adjustable, cylindrical, smooth knife, surrounded by a burr cutter, the relative positions being adjustable, and the two being separable for sharpening, as fully set forth in the above description.

GEORGE HAMMER.

No. 8423.—(Suspended.)

No. 8424.—*Improvement in Machines for twisting Fringes of Shawls, &c.*

But what we claim as our invention, and desire to secure by letters patent, is the method of selecting from the mass the threads which are to be twisted into separate strands, by means of a reciprocating or vibra-

tory finger, or the equivalent thereof, substantially as described, in combination with the first shell and wheel, or their equivalents, substantially as described, for giving the twist to the strands, as described.

We also claim, in combination with the first twister, the employment of the finger or fingers, or the equivalent thereof, for selecting and drawing together the strands which are to be twisted together to form the fringe, as described; and in combination therewith, we also claim the second twisting wheel and shell, or their equivalent, substantially as described.

JOHN NESMITH,
WESLEY SAWYER.

No. 8425.—*Improvement in Grinding Mills.*

I do not claim the original invention of the crushing cylinders, nor of a conical cast iron mill for grinding substances. But what I do claim as my invention, and desire to secure by letters patent, is the mode and manner of feeding the material to be ground directly from the crushing cylinders, through the opening in the outer cone, C, into the cavity in cone B, through the four openings therein, as they pass in turn under the opening in C, aforesaid, and thence, through the same openings, out of said cavity, between the two grinding cylinders, B and C; and also the mode and manner of making the said openings by the introvenient points, e, e, e, e.

And I also claim the arrangement of the teeth of the outer cone, C, into two sets: the first section at the smaller end being large and coarse, and turned so as to cut against the edges of the corresponding teeth of cone B; while the other section of teeth, or those towards the larger end, are finer, and turned in the opposite direction, so that their backs, and not their edges, are cut and ground upon by the edges of the corresponding teeth of cone B.

WILLIAM NEWLOVE.

No. 8426.—*Improved Door Lock.*

What I claim as my invention, and desire to secure by letters patent, is the combination in the same lock of the bolts, provided with two sets of diagonal slats, or their equivalents, the slide, running at right angles thereto, having pins, or their equivalents, and two key notches, and the drops acting as described, by which I make a right and left-hand lock, which must be locked before the key can be withdrawn, and which forces the operator to turn the key in a certain but different direction, according as either edge of the lock is uppermost.

CHARLES H. BEATTY.

No. 8427.—*Improvements in Machines for making Nuts, Washers, &c.*

What I claim as my invention, and desire to secure by letters patent, is the compressing and discharging the nut, or washer, by means of the follower or hollow piston, the bracket, the cross-head, and the moving die box, constructed and operating substantially as described.

WILLIAM KENYON

No. 8428.—*Improvement in Axle Boxes for Railroad Cars.*

Having thus fully described my improved oil box, what I claim therein as new, and desire to secure by letters patent, is the sliding partition, (*e*), operated upon by a screw, or its equivalent, in combination with the inclined bottom at the inner end of the packing space, condensing the packing more at the inner end of the packing space than at the partition, whereby the oil is prevented from escaping, as well as insuring a constant supply of oil to the journal, substantially as herein set forth.

ROBERT LEVINGTON.

No. 8429.—*Improvement in Water Wheels.*

What I claim as my improvement is the combination of the curved partition, *d*, and the air space or passage, *p*, with each two buckets, and for the purpose of causing the escape of air from the bucket into the next one in rear, all substantially as specified.

JAMES L. PARKER.

No. 8430.—*Improvement in Overshot Water Wheels.*

What I claim as my invention, and desire to secure by letters patent, is the self-acting gates attached to the buckets of an overshot water wheel, in the manner described, and for the purposes herein set forth.

EDMUND SHEETZ.

No. 8431.—*Improved Pad Lock.*

Having thus fully described my improved pad lock, and its mode of operation, what I claim therein as new, and desire to secure by letters patent, is the arrangement of the bolt, tumblers, and springs, as herein set forth, the tumblers and bolt being operated by the same springs, which also serve the purpose of throwing out the shackle, the tumblers projecting beyond the end of the bolt for that purpose; all substantially as herein described.

THOMAS SLAIGHT.

No. 8432.—*Improvement in Stoves.*

What I claim therein as new, and desire to secure by letters patent of the United States, is making, as described, a space between the fire place and the back oven, the terminus of all the flues, and causing the vertical flue between the ovens to be an ascending or descending flue, by means of the register damper, as described. And I furthermore claim the combination of the first with the second feature, for the purpose and in the manner described.

ELISHA VANCE.

No. 8433.—*Improvement in Lamps for burning Vapor of Benzole, &c.*

What I claim as my invention, and desire to secure by letters patent, is the generator and lamp herein described, consisting essentially of

chambers long and narrow at their lower extremities, and fitted with pipes, or their equivalents, for the introduction of air, the said chambers communicating at their upper extremities with a common reservoir, or vapor space, or chest, in which the vapors from the chambers are mingled prior to burning, and the relative volumes of the inflammable vapors being regulated by the adjustment of the respective currents of air, whereby the regular, proportionate, and economical consumption of the fluids is insured, and an equable light of the requisite intensity and volume is maintained, substantially as herein set forth.

CHAPMAN WARNER.

No. 8434.—*Improved Furnace employed in welding Shanks to Tools.*

Having thus described my improvements, I shall state my claims, as follow:

What I claim as my invention, and desire to have secured to me by letters patent, is the combination of the groove formed in the brick work above the fire with the aperture, *h, h*, leading thereto, and the reverberatory channel and exit flue leading therefrom, arranged with reference to each other and the fire, substantially in the manner described, whereby the flames, gases, &c., are caused to act upon both sides of such portions of the blade and shank as are to be welded to each other, and the other portions of the blade are protected from the heat, substantially as described.

JONATHAN WHITE.

No. 8435.—*Improvement in Air-heating Stoves.*

What I claim as my invention is as follows—that is to say: I claim the air space, *I, I*, the curved chamber, *H*, the series of descending pipes, *K, K*, and the ascending pipe, *N*, in combination with the air space, *X*, the chamber of combustion, and ash pit or chamber; all essentially in manner as specified.

GORDIN WILLISTON.

No. 8436.—*Improvement in Solar Lamps for burning Lard or Oils.*

Having thus described my invention, I do not claim either the use or construction of the deflector, button, or any part of the lamp separately considered; but what I do claim as my invention, and desire to secure by letters patent, is the combination of the stationary or an adjustable button, *E*, with a deflector of metal, *B*, placed above the base of the flame, attached to any lamp constructed with an argand burner for consuming lard or crude oil, substantially arranged as set forth in the foregoing specification.

JOHN G. WEBB.

No. 8437.—*Improvement in Argand Gas Burners.*

I therefore claim the construction and use of an argand burner and button, with a cone to regulate a supply of air to the base of the flame, in combination with an outside draught between the cone and a suitable

glass chimney, to complete the combustion and turn the flame over the button, such parts being applied to burning carburetted hydrogen, or similar gas, substantially as described and shown.

JOHN G. WEBB.

No. 8438.—*Improvement in Insulators for Telegraphs.*

What I claim as my invention, and desire to secure by letters patent, is casting the glass insulators of magnetic telegraph and other wires of a cylindrical form, with a flange at one end eccentric with the periphery of the same, its upper part being even with the top, and its lower part dropped slightly below the cylinder, and forming the bore of the cylinder, likewise eccentric with the periphery, so as to allow a greater body of glass to form at its lower part than its upper part, where it is slit from its outer to its inner periphery, to allow the insertion of the wire, and inserting the insulator so formed into a horizontal hole, into which the wire is previously introduced through a slit at its side, bored through the post, or through a bracket secured on its side, or to a tree, and corresponding with the form of the flange which fits therein in such a manner as to insulate the wire from contact with the post, and prevent the glass from slipping round, and consequently the escape of the wire from the glass, as herein described, or in any other form, substantially the same as the form and modifications above described.

JOHN YANDELL.

No. 8439.—*Improvement in Burglar Alarms.*

My claims in the above-described invention I shall confine to a group or train of barrels or firing chambers, in combination with the pierced fuse and vent holes, constructed, prepared, and operated essentially in the manner and for the purposes above set forth and described.

JOHN G. BOLEN.

No. 8440.—*Improvement in the Tops of Cans or Canisters.*

Having thus fully described my invention, and the advantages thereof, what I claim therein as new, and desire to secure by letters patent, is the swaging or striking up the collar to receive the cover on the conical frustum, in place of soldering a separate one on, as heretofore.

ALFRED BLISS.

No. 8441.—*Improvement in Air-heating Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the combination of a revolving cylinder or cylinders with a fire-grate, to form a heating apparatus, as above described.

CHARLES A. BOGERT.

No. 8442.—*Improvement in Ships' Winches.*

Having described my invention, its mode of construction and operation, I do not claim the rigging of a winch or windlass with counter falls,

for the hoisting and lowering of burdens on the counterpoise principle, at whatever relative distance of hoisting and lowering it may be fixed, simply as such; but I claim the combination in a ship winch of the principle of adjustability with the principle of counterpoise, whereby I am enabled to vary the relative distances of the hoisting to that of the lowering motion, so as to adapt its action to various changes of the relative distances of the hoisting to that of the lowering, as required in the lading and unlading of vessels.

I claim also therewith the principle of using a hoisting in connexion with a lowering fall, so that the burden is hoisted by one fall and lowered by the other, instead of interchanging the falls so that each load or parcel is both raised and lowered by the same fall, as has been practised in other counterpoise machines, by which means my winch is more convenient to use than it would otherwise be when the hoisting and lowering distances are dissimilar.

Second. I claim a fall or chain and hook, suspended over the deck or scaffold, working as a suspension chain and medium of transfer from the hoisting to the lowering fall of a ship winch, whereby I am enabled, as described, to transfer packages or burdens in sling from the hoisting to the lowering fall without reslinging or otherwise resting them.

THOMAS G. BOONE.

No. 8443.—*Improved Ore Washer.*

What I claim as my invention, and desire to secure by letters patent, is the combining in the same separating cistern the spiral channel, having a discharge aperture at the centre, and the revolving dasher, whose arms are immediately above the channel, for the purpose of separating metals from the impurities with which they are mechanically mixed, by acting in the manner substantially as described.

And I claim this construction, irrespective of the use of quicksilver in the channel, which may in some cases be dispensed with.

ARNOLD BUFFUM.

No. 8444.—*Improvements in dressing Cotton Duck.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the process, herein described, of softening and stretching cotton duck, by subjecting it, whilst strained, to jets of steam, and passing it over, under, or around heated stationary friction rollers, and between and around rotary pressing calender rollers, for the purposes herein specially set forth and described.

HORATIO M. GAMBRILL.

No. 8445.—*Improvement in Printing Presses.*

What we claim as our invention, and desire to secure by letters patent, is arranging upon a horizontally reciprocating carriage a blanket frame, D, pressing cylinder, C, set of inking rollers, J, and sheet-flyer, N, in such a manner that the two ends of the pressing cylinder shall roll upon the side rails, B, thus constituting a pair of the carrying wheels of the carriage, and producing a rotary motion of the pressing cylinder as it

passes over the type-form, and whereby the requisite motion is given to the blanket; the several parts being constructed and arranged substantially in the manner and for the purposes herein set forth.

JOHN R. HATHAWAY,
JOHN P. STRIPPEL.

No. 8446.—*Improvement in Washing Apparatus.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the application of boiler, (*h*), with or without divisions, placed over the revolving boiler, resting on frame, (*i*), the bottom of which boiler forms the upper half of the flue, (*m*), by which both boilers are heated by the same fire, and from which the revolving boiler may be supplied with water, as herein fully described and represented.

JAMES T. KING.

No. 8447.—*Improvements in Apparatus for regulating the Speed of Engines.*

What I claim as my invention, and desire to secure by letters patent, is governing the throw of the variable cut-off eccentric, C, for the purpose of operating the cut-off so as to regulate or equalize the speed and power of the engine, by means of the balance of or difference between the constant friction produced by the revolution of a pulley, Y, which is hung loosely upon the same shaft with the said eccentric, and driven at a speed which always bears the same proportion to, but is greater than the speed of the shaft, and the variable friction of a brake shaft, T, upon a wheel, D, which is also hung loosely upon the same shaft, and which receives or is acted upon by the aforesaid constant friction of the pulley, the tightness of the brake-strap, and the friction produced by its being controlled by a common steam engine governor; the whole operating substantially as described, the said balance or difference of friction producing either a uniformity or difference between the speed of the shaft and of the wheel, D, and the said difference in speed causing motion to be given to any train of mechanism, substantially such as is described, in communication with the eccentric.

H. A. LUTTGENS.

No 8448.—*Improvement in Machinery for enamelling Mouldings, &c.*

What I claim as my own invention is the arrangement of the conveyor, constructed so as to form, in connexion with the moulding or the article to be enamelled, a reservoir to contain the composition, said moulding forming, as it were, a sliding bottom to the reservoir, by which means the composition is spread upon its surface, as set forth. I claim also the clamp for fastening and releasing the end of the article to be enamelled; the whole being constructed and operating substantially in the manner and for the purpose described therein.

ROB'T MARCHER.

No. 8449.—*Improvement in the Mouth-Piece for Wind Instruments.*

What I claim as my invention, and desire to secure by letters patent, is a mouth-piece, with an artificial embouchure, or lips, attached to it, using for that purpose any elastic and water-proof material which will produce the intended effect.

CHARLES L. MEECH.

No. 8450.—*Improvement in Sugar Vacuum Pans.*

Having thus fully described my improved apparatus, and its purposes, I claim as my invention, and desire to secure by letters patent, firstly, the evaporating and condensing tubes, constructed and arranged in the manner and for the purpose set forth; they, being attached at one point only, through which the steam enters, have freedom to expand or contract without injury; and the evaporating tubes being combined at the centre of the series, as above especially set forth, with the boiler, the steam is conveyed from the boiler to the extremities of all the tubes in the most direct manner.

I also claim connecting the filters with the vacuum pan, in the manner and for the purpose set forth, so that the vacuum pan shall perform the double office of making the vacuum in the filter and boiling in vacuo.

I also claim the construction and arrangement of the condenser tubes, above specified, the ends of said tube being turned back inward nearly the whole length of the outer portion, as distinctly shown in the drawing.

J. M. MILLER.

No. 8451.—*Improvement in Running Gear of Railroad Cars.*

What I claim as my invention, and desire to secure by letters patent, is the employment of the bar, B, B, and ball and socket joint, D, E, attached to the end of B, B, with a hinge in combination with the pivot, C, on the truck-frame, for directing and turning said frames, (but not drawing the train by said ball and socket-joint, as I do not dispense with the ordinary traction or coupling bar, H,) and thus bring the axis of each truck coincident with the radii of the curve of the track, and lead the whole train over any point on the track previously passed by the locomotive, without requiring the action or aid of the flanges, or any of the wheels, except those on the locomotive; thus preventing the abrasion or wear of the rails and liability of the train being thrown off.

W. NEBINGER.

No. 8452.—*Improvement in Piano Forte Strings.*

I do not claim, as my invention, simply the application of silver to the strings of pianos, for the purpose stated, as that has before been done by wrapping the strings with silver wire; but, when wrapped with wire, are liable to rattle when struck by the hammers.

What I do claim as my invention, and desire to secure by letters patent, is coating the smaller strings of pianos with silver, or an alloy thereof, for the purpose of improving the tone and preventing the rusting of the strings, substantially as specified.

HENRY J. NEWTON.

No. 8453.—*Improvement in Excavating Machines.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the within-described arrangement of parts, by which the elevators can be raised or lowered to correspond with any irregularity or unevenness of ground.

And I also claim making the operation of dumping self-operating, by means of the friction roller acting on the periphery of a pulley permanently attached to the shaft, as herein fully described and represented, and for the purpose made known.

BENJAMIN W. REMY.

No. 8454.—*Improvement in Saddles.*

What I claim as my invention, and desire to secure by letters patent, is the combination of levers and spring as set forth in the specification and drawings.

JOHN C. FR. SALOMON.

No. 8455.—*Improvement in Cast Iron Car Wheels.*

What I claim as my invention, and desire to secure by letters patent, in the shape of cast-iron car wheels, is the forming of said wheels with corrugations in the direction of the radii, which corrugations are reversed in passing from the hub to the rim, so that the parts convex at the hub, in passing towards the rim, gradually lessen their convexity, and then become concave, and increase in their concavity till they reach the rim; and so that, on the other hand, the parts concave at the hub, in passing towards the rim, gradually lessen their concavity, and then become convex, and increase in their convexity till they reach the rim; the arches or central lines of the corrugations thus cutting obliquely and passing through, alternately, from one side and from the other, a plane supposed to be at right angles to the axis of the wheel, and to pass through the middle of the hub; and the said corrugations, in their radial direction, being either straight or curved; the whole constructed substantially in the manner and for the objects herein set forth.

BENJAMIN SEVERSON.

No. 8456.—*Improvements in Machinery for shaving, nicking, and re-shaving Wood Screws.*

Having thus described the principle or character of my invention, and the manner of constructing and using the same, I wish it to be distinctly understood that I do not limit myself to the precise construction and arrangement of the parts, as these may be variously modified without affecting the principle or mode of operation which I have invented and claim to be new.

What I do claim as my invention, and desire to secure by letters patent, is so combining the shifting mandrel that carries the blanks with a shaving and nicking apparatus, substantially as described, that the blank, after being shaved to give the required form to the head, and whilst held in the same mandrel, may be shifted to the nicking appa-

ratus, and, after being nicked, reshifted back to the same shaving apparatus, to have the bars removed by the same cutter that performed the first shaving operation, as herein set forth.

I also claim the employment of two shifting mandrels, substantially as specified, in combination with the shaving and the nicking apparatus, substantially as herein described, so that the nicking operation can be performed on one blank whilst the first and second shaving operations are being performed on other blanks, as specified.

And I also claim giving to the mandrel, or mandrels, end-play in their boxes, in combination with the permanent rest at the back of the mandrel, and with the cutter, substantially as specified, by means of which the same position of the blank relatively to the cutter is obtained for the second shaving operation which it had for the first, as described.

THOS. J. SLOAN.

No. 8457.—*Improvement in Box Opener.*

What I claim as new, and desire to secure by letters patent, in an instrument for opening boxes, is the combination of the lever, A, with the brace, F, constructed and operating substantially as described, either with or without the heel, H.

GEO. C. TAFT.

No. 8458.—*Improvement in Machines for Dressing Stone.*

Having thus fully described the construction and operation of my machine, what I claim therein as new, and desire to secure by letters patent, is the manner of attaching the pick-head to a strong, but flexible steel spring, which falls on a box spring, whereby the desirable whip or spring blow is given to the pick, substantially as described.

I also claim the combination of the lever, F', and connecting lever, G, and crank screw, for graduating the action of the pick while cutting the furrow of mill stones, gradually decreasing the force of the blow as the pick approaches the feather edge of the furrow, substantially as described, and represented.

JOSEPH V. TILTON.

No. 8459.—*Improvement in the Seeding Apparatus of a Seed Planter.*

What I claim as my invention, which I desire secured to me by letters patent, is giving the seed-rollers an intermittent rotary motion, substantially in the manner and for the purposes set forth.

CORNELIUS C. VAN EVERY.

No. 8460.—*Improvement in Machines for peeling and cutting Peaches.*

What I claim as my invention, and desire to secure by letters patent, is the application of a revolving rasping surface to the purpose of peeling peaches, or other like fruits; and also the method of cutting peaches by a knife revolving in a box, having an opening in the bottom, in such a manner that the stone of the peach is struck out and the pulp thereof cut into pieces proper for drying, in the manner above described. And

I claim and desire that such letters patent should secure to me the aforesaid methods of peeling peaches, and of cutting the same, as well separately as when combined together, in the manner hereinbefore particularly described.

JOSHUA O. WARD.

No. 8461.—*Improvement in Swinging Cradles.*

What I claim as my invention, and desire to secure by letters patent, is the self-adjusting pivot or connexion, produced by the ball or weight, M, suspended from the arc, o, o, by bent rods or hooks, P, P, said hooks having sufficient adhesion to communicate motion to the cradle from the motive-power before described; thus constituting a sliding instead of a fixed pivot upon the end of the cradle, making it a matter of indifference on which side of the cradle the child may be lying, without stopping the motion of the cradle, which, with the crank alone, would stop. The action of this cradle is so gentle, and works so steadily, as to be free from noise.

LUCIUS F. WHITAKER.

No. 8462.—*Improvement in Portable Water Closets.*

Having thus fully described the nature of my invention, and the manner in which it is constructed, what I claim as new, and desire to secure by letters patent, is the manner of construction as described, and for the purpose specified, viz: the vessel, B, resting upon the partition, a, in the interior of the case, A, and the circular rim, D, projecting a short distance over the edge of the cover, C, when on the vessel, B, and resting upon the top edge of the vessel, B, when the cover, C, is off of it, in order to form the seat; the whole arrangement being covered by the cover, E, of the case, A, substantially as set forth.

GEO. R. WILMOT.

No. 8463.—*Improvement in Seed Planters.*

Having thus described the nature and operation of my invention, I will now state what I claim as new, and desire to secure by letters patent.

I claim the employment of the indicator, I, having its ends bent as described, or in any other manner substantially the same, and secured on the main shaft in such a manner that it can be disengaged or thrown into connexion with the wheel as desired, for the purpose of indicating the place where the corn has been planted, in the manner and for the purposes substantially as set forth.

MYRON CORY.

No. 8464.—*Improved means for attaching Augers, &c., to their handles.*

Having thus described the nature of my invention, and the manner in which it is constructed, what I claim as new, and desire to secure by letters patent, is the method of securing augers, and other implements, to handles by means of a socket, D, and ferrule, or cylindrical slide, E,

constructed as described, viz: the socket being placed underneath a mortise hole, C, in the handle, and perforated with an oblong slot, (a,) the edges of the slot being bevelled to correspond to notches (c) in the shank, B, of the implement, the upper surface of the socket being inclined, and the shank, B, moved along the slot (a) by means of the ferrule or cylindrical slide, by which the bevelled edges of the slot bind or wedge in the notches, and the taper form of the shank drawn firmly in the hole (d) through the ferrule or slide, substantially as described.

MERRITT S. BROOKS.

No. 8465.—*Improvement in Machines for pegging Boots and Shoes.*

Having thus described my improvement in the implement for pegging shoes, what I claim as new, and desire to secure by letters patent, is splitting the peg from the peg-wood, and driving it into the sole of the shoe, by a single blow of the plate, E, acting on the peg-wood, and forcing it upon the knife, I, substantially as herein described.

I also claim mounting the peg-wood or block in a vertically sliding carriage, or the equivalent thereof, in combination with the stop-plate, S', knife, I, and fingers, T', operated substantially as herein set forth.

A. C. GALLAHUE.

No. 8466.—*Improvement in Machines for drying Bagasse.*

Having thus fully described my improvements in apparatus for drying bagasse, &c., I wish it to be understood that I do not claim for such purposes a heated cylinder, revolving upon an inclined axis, such cylinders, in various forms, having been long in use; but what I claim herein as new and of my invention, and desire to secure by letters patent, is—

Firstly. The arrangement (substantially as herein described) of two cylinders, one so secured (by hollow bolts or rivets) concentrically within the other as to leave between them an annular steam space, crossed by ventilating apertures, and the whole made to revolve around an inclined axis, for the expeditious drying (free from the danger of accidental ignition) of bagasse, and other like substances.

Secondly. The steam and condensed water pipes, revolving together (one within the other) within a common journal bearing, and entering the steam space of the cylinder, in oppositely oblique directions, as described, for facilitating at the same time the discharge of the water and the omission of steam, during the revolution of the cylinder.

SAMUEL H. GILMAN.

No. 8467.—*Improvement in Boot Trees.*

What I claim as my invention, and desire to secure by letters patent is the set-screws, m and n, and plate, x, in combination with the screw, g, substantially in the manner and for the purpose herein described and set forth.

D. R. HENDRIX.

No. 8468.—*Improvement in Swinging Cradles.*

What I claim as my invention, and desire to secure by letters patent, is the combination of a cradle with pendulum rods and balls, or weights, attached thereto, and set in a frame so as to swing therein, in the manner and for the purpose above set forth.

SELDEN W. KNOWLES.

No. 8469.—*Improvement in Oil Presses.*

Having described my invention, what I claim as new, and wish to secure by letters patent, is as follows—

The combination of the heating plates with the steam chamber, substantially as herein set forth, the plates being moved parallel, and the steam tubes connecting them with the steam chamber sliding in stuffing boxes in a line with the motion of the plates above set forth, said steam chamber being placed in a proper relative position with the plates for that purpose.

D. L. LATOURETTE.

No. 8470.—*Improvement in Piano Fortés.*

What I claim as my invention, and desire to secure by letters patent, is, first, the manner, substantially as herein described, of placing or arranging the strings of a piano forte, to wit: the shorter string or strings of the higher octaves across the narrower portion of the instrument, and the longer strings, or those of the lower octaves, crossing them in the direction of the greatest length of the instrument, so as to include the greatest possible size of string within the instrument, for the purposes specified.

FR. MATHUSHEK.

No. 8471.—*Improvement in the method of moulding Kettles with Spouts.*

Having thus described my method of moulding tea kettles, I do not claim any peculiarity either in dividing the pattern or using a green-sand core; but what I do claim as my invention, and desire to secure by letters patent, is providing the pattern, B, with two projections or solid pieces—one, G, on the under side of the spout portion, D, to prevent sand entering the spout when forming the green core of the body, and the other, H, on the upper side of the spout, D, for forming a print in the sand to receive the projection, I, of a dry sand core, G', I, by the use of which, in connexion, the said dry sand spout core, G' I, can be inserted in the drag portion of the mould after the removal of B, but before the removal of A, and be held firmly in its required position, by which means the pattern, A, is made to adjust the spout core, and greater truth secured in setting the spout core, and fewer defective casts result; in the manner set forth substantially in this specification and accompanying drawings.

W. H. PEASE.

No. 8472.—*Improvement in Dairy Stoves.*

Having thus fully described the improved apparatus, and its mode of construction, what we claim therein, and desire to secure by letters

patent, is, first, the arrangement of the flues and valves in combination with a water pan and fire-box, substantially in the manner and for the purpose set forth.

We also claim the combination of flues and valves as herein specifically mentioned, for the purposes described.

JOEL STEVENS,
H. J. RUGGLES.

No. 8473.—*Improvement in Machines for taking Yeas and Nays.*

What we claim as our invention, and desire to secure by letters patent, is the method of dividing the yea and nay votes, and showing the vote by weighing the yea and nay balls, or their equivalents, in the opposite pans of a scale beam, substantially as herein set forth.

We also claim the method of enumerating the votes upon a question by weighing the balls, or their equivalents, by spring balances, or their equivalents, whose indexes indicate the number of ballots in their respective scale pans, substantially as herein set forth.

We also claim the combination of the scale beam and spring balances, or the equivalent thereof, arranged substantially as herein described, for the purpose of showing simultaneously both the number of votes taken on each side of the question and the relative values of the two sets or classes of votes, as herein set forth.

We also claim the employment of mechanism for the purpose of recording the vote and showing whether it is yea or nay at a single operation, substantially as herein described.

We also claim the employment of mechanism for the purpose of recording the vote and showing the enumeration thereof at a single operation, substantially as herein described.

And, lastly, we claim the employment of mechanism for the purpose of recording and enumerating the vote, and showing whether it is yea or nay at a single operation, substantially as herein described.

THOS. B. STOUT,
JAMES F. MORELL.

No. 8474.—*Improvement in Cements for grinding Cylinders.*

Having thus fully described my improved composition, and the manner of applying it, what I claim therein as new, and for which I desire to secure letters patent, is the composition herein described, consisting of the whey of milk, vinegar, glue, spirits of wine, and ether, substantially in the manner and for the purpose set forth.

I also claim the combination thereof with emery to construct a grinding cylinder or other surface, in the manner described.

JACOB STEPHEN.

No. 8475.—*Improvement in Machines for printing in Colors.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is in combination with receiving, distributing, and inking rollers, arranged as herein described, the adjustable ink trough, provided with removable partitions, and perforated side, so as to give out the ink in lines or belts, corresponding with the lines or size of the type, in the form for the purpose herein described.

R. S. WEAVER.

No. 8476.—(Suspended.)

No. 8477.—*Improvement in the use of Steam to make Zinc White.*

Having thus fully described the nature of my invention, and some of the means by which the same may be put into practical use, what I claim therein as new, and desire to secure by letters patent, is mixing the vapor or gases of water or steam with the heated vapor of zinc, or of its ores, as set forth, for the purpose of manufacturing zinc white for commercial uses.

I also claim, in combination with the process for manufacturing zinc white, substantially as herein described, the making of hydrogen gas for light, heat, or motive power, as herein fully set forth.

HENRY W. ADAMS.

No. 8478.—*Improvement in Baby Jumpers.*

I do not claim the use of spring, or the means of giving motion for the purpose of exercise or amusement, as that has been before employed in a variety of ways; but I do claim the combining of springs with a frame and seat in the manner described, forming an apparatus for teaching children to stand and walk, and, at the same time, to prevent the child from bearing its whole weight upon its feet, as it sits upon the seat or saddle, and can at its option either stand upon its feet or sit down; and at the same time move itself in any direction with its feet, and its body securely sustained in an upright position, after the upper top is locked around its waist, in the manner described; and it can at its option either move by a motion of its limbs, or use the machine as a jumper for amusement, as the accompanying description and drawing represent.

EUCLID RICE.

No. 8479.—*Improvement in Apparatus for watering Cattle.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is in combination with a pump, worked by an endless chain of elastic balls, and operated upon by the weight of cattle, the spiral spring, (r,) operating between a stationary collar and the movable cogged and threaded sleeve, (E,) for the purpose of more certainly running the sleeve into gear when the cattle step upon the platform, and for gradually stopping the platform as it rises, and the buckets as they run back into the stack or pipe, for the purpose of carrying back the water, as herein fully described and represented.

S. W. WOOD.

No. 8480.—*Improvement in Threshing and Separating Grain.*

First. What we claim as our invention, and desire to secure by letters patent, is the method, herein described, of constructing threshing cylinders with curved knives, or otherwise shaped in the end, for the purposes herein described.

Second. Also, the method, already described, of working the separator by means of the jumping wheels and concave tracked brackets, or by any modification of it whereby the action is substantially the same.

CYRUS ROBERTS,
JOHN COX.

No. 8481.—*Improvements in Air-Engines.*

What I claim as my invention, and desire to secure by letters patent, is the working cylinder and piston, and the supply cylinder and piston, of less piston surface, the two pistons being connected with each other, and working together, substantially as specified, in combination with the regenerator and heater, so that the air, or other circulating medium, shall pass from the supply cylinder to the working cylinder through the regenerator, substantially as specified, and give motion to the engine through the difference of area of the pistons; and this I claim, whether the air, or other circulating medium, be made to pass on the return stroke from the regenerator to the supply cylinder, or any other receiver, or into the atmosphere.

I also claim, in connexion with the working cylinder, the employment of two regenerators, substantially as specified, in combination with the valves, or their equivalents, for the purpose of causing the air, or other circulating medium, to pass, during a series of strokes, through one of the regenerators to the working cylinder, and back from the working cylinder through the other regenerators, and then reversing the action, as substantially specified.

I also claim interposing the heater between the regenerator and the working cylinder, substantially as specified, to heat the air, or other circulating medium, as it passes from the regenerator to the working cylinder, as specified, to supply the heat required.

And, finally, I claim communicating the power of the engine to the working beam or its equivalent, by the attachment thereof to one of the pistons, or piston-rods, between the open ends of the two cylinders, said pistons being connected or braced to each other, substantially as specified, whereby I am enabled to render the engine compact, and effectually to brace and connect the two pistons and avoid undue strain, as specified.

J. ERICKSON.

No. 8482.—*Improvement in Machines for forming Horse Collars.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the moving, tapering block with the adjustable stationary dies; the two being constructed and arranged substantially as herein set forth.

ISAAC DAVIS.

No. 8483.—*Improvement in Cultivators.*

What I claim, and desire to secure by letters patent, is the intermediate jointed ploughs, in combination with the main cultivating ploughs, as described, for enabling the ploughman to plough nearer to, or further from, the rows at will.

ISAAC CONSTANT.

No. 8484.—*Improvement in Seed Planter.*

Having thus described the nature and operation of our invention, what we claim as new, and desire to secure by letters patent, is in combination with the seed box, A', and cap, n, arranging the rotating disk, i, verti-

cally, and providing it with the projections, *j*, and the stationary vertical disk, *b*, provided with an opening, *h*, for receiving the grain and the flanches, *c*, *e*, between which the said projections rotate, and by which the grain is carried from the seed box to the cap, and thence to the seed-ing tube; the whole being arranged in the manner and for the purpose specially set forth and described.

NEWTON FOSTER,
GILBERT JESSUP,
HIRAM L. BROWN,
CALVIN P. BROWN.

No. 8485.—*Machine for measuring and cutting Iron.*

What I claim as my invention, and desire to secure by letters patent, is the measuring wheel, placed in any suitable position, in combination with the cutter, bed plate, and spring, or its equivalent; the whole being arranged and combined, substantially as described, for the purpose herein set forth.

LEVI B. GRIFFITH.

No. 8486.—*Improvement in Desks.*

Having thus fully described the construction and operation of my elevating desk, what I claim as new, and of my invention, and desire to secure by letters patent, is the raising of a horizontal surface at the back part of the desk or table when the front part is being raised, to form an inclined plane by means of the arrangement of the screw and lever, or any analogous device, the front part being hinged to the elevating frame, *K*; the same to be applied to standing or sitting desks or tables, substantially in the manner and for the purpose set forth.

JOHN T. HAMMITT.

No. 8487.—*Improvement in Radiating Surfaces.*

What I claim, and desire to secure by letters patent, is the application of the tapering form to radiating surfaces, constructed in the compact and available manner above described.

JOSHUA K. INGALLS.

No. 8488.—*Improvement in Tanners' Oil from Rosin.*

What I claim as my invention, and desire to secure by letters patent, is the new and original product or manufacture which I denominate Robbins's tanners' oil, or Robbins's curriers' oil, the process of producing which I have herein fully set forth.

I also claim every use and application of my said oil.

LEWIS S. ROBBINS.

No. 8489.—*Improvement in lubricating Oil from Rosin.*

What I claim as my invention, and desire to secure by letters patent, is the new and original product or manufacture which I denominate

Robbins's lubricating oil, the process of producing which I have herein fully set forth.

I also claim every use and application of the said oil.

LEWIS S. ROBBINS.

No. 8490.—*Improvement in distilling Acid and Naphtha from Rosin.*

Having thus fully described my new and improved process of distilling rosin, what I claim therein as my invention, and desire to secure by letters patent, is—

First. The process of separating the acid and water, arising from the decomposition of rosin, at the temperature of 325 degrees Fahrenheit, or thereabout, by means of fire heat, substantially in the manner herein set forth.

I also claim, in combination with the above, the process of separating the naphtha from the other component parts of the rosin by preserving the temperature of the liquid mass within the still at about the range of 325 degrees Fahrenheit, as above stated, and injecting steam into the same, by which I am enabled to throw off the naphtha at the same temperature employed for throwing off the acid.

I do not intend to limit my improved process of distillation, as hereinbefore described, to the production of oil from rosin, but shall employ it for redistilling the crude article known as rosin oil.

LEWIS S. ROBBINS.

No. 8491.—*Improvement in Paint Oil from Rosin.*

What I claim as my invention, and desire to secure by letters patent, is the new and original product or manufacture which I denominate Robbins's paint oil, the process of producing which I have herein fully set forth.

I also claim every use and application of my said oil.

LOUIS S. ROBBINS.

No. 8492.—*Improvement in the manufacture of Charcoal.*

What I claim as my invention, and desire to secure by letters patent, is the iron cylinder with a double bottom, the upper one being perforated, and these combined with several flues, covered at the top with dampers, and protected within with iron rings, the whole so constructed that the fire may be applied either on the top, under the bottom, or within the flues, or in all together, at pleasure; and the whole adapted, as herein described, to the uses and purposes specified, and these only.

WM. P. McCONNELL.

No. 8493.—*Improvement in Folding Doors of Stoves.*

Having thus fully described my improved doors for grates and stoves, what I claim therein as new, and for which I desire to secure letters patent, is the sliding and folding doors, in combination with pilasters, by which I prevent the heating of the doors and warping consequent thereon and admit a free radiation of heat from the side of the stove, substantially in the manner and for the purposes set forth.

JAMES ROOT.

No. 8494.—*Improvement in processes for Dyeing Blue.*

I claim as my invention the mode of producing a dark blue, or color to take the place of indigo, which color can be produced at a very great saving of expense, in comparison to that incurred by the employment of indigo in the usual way.

I do not mean to claim the use of a prussiate of potash dye alone; but do claim the employment of such dye, in combination with either one or more of the above-named woods, substantially in manner as specified.

EDWARD SWINEY.

No. 8495.—*Improvement in Compounds for Extinguishing Fires.*

What I claim is the application of a compound of sulphur and nitre, in a state of combustion, within a room or apartment on fire, for the purpose of extinguishing the fire tending to destroy the said room or building thereof.

JOSHUA UPHAM.

No. 8496.—*Improvement in Springs.*

Having described the nature of my said invention, and the manner of performing the same, I declare that I claim, as of my invention, the above specified mode of arranging or combining springs and inclined planes, or surfaces, curved or plane, so that the points, or arms, of the springs may be applied to or press against the inclines, or inclined planes, for the purpose of thereby obtaining the action of said springs, in manner herein-before described.

JAMES WEBSTER.

No. 8497.—*Improvements in Planing Machines.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the application of springs or weights to cutter stocks, both at their point, in line with the cutting-edge of the knife, and also to the heel, by which a double action is given to the stock, both at the heel and edge, allowing it to rise and oscillate to the inequalities of boards or plank, substantially as described and for the purposes herein set forth.

GEO. W. BEARDSLEE.

No. 8498.—*Improvement in Carriage Springs.*

My improvement, and, therefore, what I claim, consists in combining buttress blocks, C, D, with the wood bar, A, and the metallic strap bar, B, in such manner, substantially as specified, so that such blocks, when the spring is in use, shall act as levers, to compress the wood and counteract the tendency of the fibres to be elongated and ruptured by the downward strain.

LEVI BISSELL.

No. 8499.—*Improvement in Machines for Dressing Staves.*

What I claim as my invention, and desire to secure by letters patent, is dressing staves by means of stationary knives, in combination with a pressure roller, directly over the cut, when this is combined with the bed, constructed with a raised portion where the cutting is done, for the purpose of allowing a crooked or bent stave freedom of motion while being dressed, substantially as described.

LEWIS S. CHICHESTER.

No. 8500.—*Improvement in Bating and Tanning Hides.*

What I claim as my invention, and desire to secure by letters patent, is the method, herein described, of bating hides and other skins in the process of tanning, by subjecting them to a vapor bath, applied substantially in the manner herein described.

I also claim the combination of the rocking frame and the shaft above, the two being connected, as herein set forth, in such manner that the shaft may be used either to rock the frame or to raise it from the vat.

WM. B. MILLIGAN.

No. 8501.—*Improvement in Cheese, Butter, and Bread Cutters.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the circular revolving table (*e*) and knife, (*l*), the said knife being attached to the sliding shaft, (*i*), and operated by means of a treadle (*k*), and weighted cord and pulley, or their equivalents, so that the cheese, or other article to be cut, may be placed upon the table and not removed until, by a single revolution of the wheel, and a few slight pressures of the foot upon the treadle, it is cut into as many parts as may be desired, without crumbling or waste.

B. F. ADAMS.

No. 8502.—*Improvement in the construction of Scythe Fastenings.*

What I claim as my invention, and desire to secure by letters patent, is the mode of adjusting the lever, D, by rotating the ring, C, around its own axis, by which the point of the scythe is thrown out or drawn in, as shown and described, the upper end of the lever, D, passing through an eye, *g*, attached to the ring, C, the fulcrum of the lever being near the end of the snath, as shown at *e*, and the scythe attached to the lower end of the lever, as set forth.

DAVID ANTHONY, SEN.

No. 8503.—*Improvement in Hand Planes.*

What I claim as my invention, and desire to secure by letters patent, is the application to carpenters' planes and moulding tools of a new method of confining the iron, by a metallic apparatus, acting upon the principles of the lever and cam, in combination with the set screw for adjusting the same, as herein described, using for the purpose the afore-said contrivance or arrangement of parts, or any other substantially the same, and which will produce the same effects in like manner.

BENJAMIN F. BEE.

No. 8504.—*Improvement in Screens of Winnowing Machines.*

I do not claim any part or portion of the gear, fans, or forms of the hopper or shoe as an original invention, as I am aware that all these have been in common use.

But what I do claim as new, and desire to secure by letters patent, is the arrangement of guides, D, D, and side apertures on the upper movable screen, as seen in figure 3, and the lower screen, as seen in figure 4, attached to the shoe, and which screen may be attached to any common winnowing machine, in the manner and for the purposes before described.

JONATHAN BEAN.

No. 8505.—*Improvement in Stave Jointing Machines.*

What I claim as my invention, and desire to secure by letters patent, is the adjustable knife, in combination with the adjustable rest, as described, to adapt them to the jointing of staves for casks of different bilge.

DANIEL DRAWBAUGH.

No. 8506.—*Improvement in Shuttle motions of Looms.*

What I do claim, and desire to secure by letters patent, is hanging the picker staff or staves upon radius rods, D and E, having two distinct radial motions, substantially as herein set forth, for the purpose of causing the end which operates upon the shuttle to describe or make a rectilinear motion parallel with the raceway, and with less power than has heretofore been done.

GEORGE W. PERRY.

No. 8507.—*Improvement in Machines for cutting the Soles of Boots and Shoes.*

What I claim as my invention, and desire to have secured to me by letters patent, is the mode or means, hereinabove described, for insuring the unerring turning of the knife-frame for cutting both sides of the sole, said means consisting of the notched pawl lever and spring, y, y, operating on the journal plates of said frame, substantially as hereinabove described.

JOSEPH STEGER.

No. 8508.—*Improvement in Car Seats.*

Having thus described the nature of our invention, what we claim as new, and desire to secure by letters patent, is the arrangement of two levers in a cross position, so that any required height of back may be carried and reversed from and to either side of the seat, and secure it firmly in its position at any required angle, substantially the same as described and represented.

EZEKIEL BOOTH,
EZRA RIPLEY.

No. 8509.—*Improvement in Telescopes.*

What I claim as my invention, or improvement, consists in combining the glasses, or glasses and diaphragms, with a sliding or eye-piece tube, A, of a telescope, by means of a tube, or slide, B, perforated through its side or sides in such manner as to enable a person, when the said tube, B, is withdrawn from its enclosing tube, to obtain ready access through the openings, or perforations, to the glasses, or lenses; the whole being substantially in the manner and for the purpose as described.

ALVAN CLARK.

No. 8510.—*Improvement in Machines for cutting Hides.*

What I claim as my invention is the combination of mechanism for reducing dry hide to a strip, and mechanism for cutting or removing the hair from the under-side of the said strip, at one continued operation, substantially in the manner as described.

JACOB C. FLINT.

No. 8511.—*Improvement in bending Felloes.*

What I claim as new, and desire to secure by letters patent, is the curbs, C, D, in combination with the box, B, or its equivalent, said curbs being constructed in the manner and for the purpose substantially as described.

A. W. JOHNSTON.

No. 8512.—*Improvement in Card Grinders.*

What I claim, and desire to secure by letters patent, is an instrument for grinding or sharpening wool, cotton, or other cards, made with sectional card teeth, which are so bent at the heel as to make the sharp edge more prominent than its opposite and broad edge, together with its application to the card that is to be ground in such a direction as to cause the sharp edge of the teeth of the grinder to be first presented to and enter among the teeth of the card.

RICHARD KITSON.

No. 8513.—*Improvement in Daguerreotype Apparatus.*

Therefore, we claim—

First. The construction of a camera box, with a cross-opening, or mortise, to receive a sliding frame, that carries both an object glass and the Daguerreotype plate, as described.

Second. The construction and application of a sliding frame, *i*, with a division, to receive a frame carrying an oblong object glass, so formed as to be placed either vertically or horizontally, as described and shown.

Third. The construction of the slide, *i*, so as to receive in the other division a Daguerreotype plate in a frame, *n*, such frame, *n*, being pressed in place by springs, 16, and held in place by blocks, 17, taking notches in the frame, *n*, as described and shown.

WILLIAM LEWIS,
W. H. LEWIS,
HENRY J. LEWIS.

No. 8514.—*Improvement in coupling Railroad Cars.*

What I claim as my invention, and desire to secure by letters patent, is the combination of a stiff car coupling with the ends of a couple of cars, and with the trucks under the same, substantially in the manner herein set forth, by which the cars are made to guide the trucks under them, and keep them in their proper positions on the track—to wit, in such positions that a line drawn midway between and parallel with the truck axles will be at right angles to any straight track, and also at right angles to the tangent of any curved railroad track.

LORENZO D. LIVERMORE.

No. 8515.—*Improvement in Abdominal Supporters.*

What I claim as my invention, and desire to secure by letters patent, is the employment of a pubic brace of the peculiar form herein described, and as represented in figs. 2, 3, 4, 5, 6, and 7 of the drawings, so as to fit the os pubis, and press uniformly upon the inguinal region, while the upper edge of the brace is bent forward so as to effect no inconvenient pressure upon the abdomen of the wearer; said pubic brace being made of hammered leather, or other tenacious material, in the manner and for the purpose herein described.

A. J. LONSBURY.

No. 8516.—*Improvement in Bedsteads.*

Having thus described the nature of my invention, and the manner in which it is constructed, what I claim as new, and desire to secure by letters patent, is the manner of securing the lower bedstead to the upper one, so that it may slide underneath the upper one, or be drawn out from it, as described, viz: by having the clamps (*g*) attached to the upper part of the foot-posts, E, of the lower bedstead, said clamps fitting in the recesses (*a*) of the rails, A, of the upper bedstead, and the rails, D, of the lower bedstead, passing through the mortise holes (*b*) in the foot posts, C, of the upper bedstead, substantially as shown and set forth.

LEVI NEWCOMB, JR.

No. 8517.—*Improvement in Horse Collars.*

What I claim as my invention, and desire to secure by letters patent, is connecting the sides of the breast plate, C, by a flat joint, A, in combination with the levers, D, attached to the sides of the breast plate, and rising over the neck without touching the shoulders of the animal, and connected at the top, by which means the breast plate is made adjustable to the size of the horse, substantially as herein set forth.

R. RICKEY.

No. 8518.—*Improvement in Grain Kilns.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the heating chamber, D, with the two drying beds, one above and the other below, as described.

ISAAC S. STOVER.

No. 8519.—*Improvement in Frosting Plates of Glass.*

What I claim as my invention, and desire to secure by letters patent, is the use of a rocker containing pebbles, sand, and water, for the purpose of frosting plates of glass, or embossed work, as above described.

ISAAC TAYLOR.

No. 8520.—*Improvements in Apparatus for sizing and dyeing Yarn.*

What I claim as my invention, and desire to have secured to me by letters patent, is—

First. The conducting of yarn or thread from section or warper beams directly into and through the size or coloring liquids to the pressure rollers, by a series of rollers, more or less in number, placed as nearly in contact with each other as the nature of the case will admit, the closer the better, sufficient space being allowed between the fixed rollers for the passage of the yarns or threads, thus enabling the said rollers to operate as guides to each and all the threads, to prevent them from matting or clinging together, and superseding the otherwise necessary use of reeds, rattles, or other separators.

Second. I claim the taking or making of a weaver's lease, or series of leases, at the commencement of the process of warping or beaming of yarn or thread on section or warper beams, and at proper intervals on the same, to correspond with required lengths of yarns or threads on weaving beams, and preserving the same throughout the sizing and drying, thus dispensing with the use of hacks or lease takers in the dresser, and the otherwise necessary stoppage of the dresser or sizer, for the purpose of tying or twisting together each separate thread.

ALONZO BASCOM.

No. 8521.—*Improvements in Printing Presses.*

Having thus fully described the nature, construction, and operation of my invention, I will proceed to state what I claim, and desire to secure by letters patent—

First. I claim hanging the type bed and platen upon cranks on rotating shafts, C, C', and D, D', arranged and operating in the manner substantially as herein described.

Second. I claim the spring presser, W, attached to the type bed or platen, for the purpose of pressing the band, *e*, communicating motion to the sheet, against the opposite surface of the platen or bed, and causing it to be moved at precisely the same speed as the bed and platen, substantially as described.

Third. I claim the arrangement for carrying and giving motion to the inking roller, consisting of the barrel, P, the bars, Q and *p*, the lever, R, springs, *r* and *t*, and band, *u*, combined together, and with the above type bed and platen, in the manner substantially as set forth.

THOMAS H. DODGE.

No. 8522.—*Improvement in Machines for cutting Combs.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the wheel,

B, with the cutters, *t*, placed on its periphery, as described; said wheel having a rotary motion, and also a vertical reciprocating motion, in a transverse line with its axis, for the purpose of turning or cutting comb-teeth, substantially as described; said motions being given the wheel by means of the cams, H, I, levers, P, U, and pawls, *l*, *n*, or their equivalents, as set forth.

S. CURTIS.

No. 8523.—*Improvement in Stove Grate Bars.*

Having thus described my construction of fire-grate, what I claim as new, and desire to secure by letters patent, is the manner, described, of forming separate grate-bars for vibrating grates, rounded at their ends, secured and working in grooves of the frame, as described.

GEORGE. W. GARDNER.

No. 8524.—*Improvement in Ploughs.*

What I claim as my invention, and desire to secure by letters patent, is a cotton scraper, constructed as herein described, with a share and mould-board projecting from the side of the landside, opposite that to which the earth is thrown, the landside thus extending from the point of the scraper to that wing of the mould board opposite the one to which it usually extends; and the several parts being so arranged that the landside will run deep enough to hold the implement firmly to its work, the share will pare the ground and cut off the weeds near the roots of the plants, and the mould-board will conduct the same towards the middle of the space between the rows.

HENRY GOLDSSEN.

No. 8525.—*Improvement in Propellers of Machinery to be used in Currents.*

What I claim as my invention, and desire to secure by letters patent, is the application, for the purpose specified, of one or more levers, A', A, with the floats or blades, B, B, at their lower ends, against which the current acts; said levers being attached, at about their centres, to an adjustable frame, D, by a universal joint, C, as described; the upper ends of the levers being attached to cranks, I, I, by which, through any suitable gearing, motion is communicated to the shaft, M, substantially as described.

JAMES HARDIE.

No. 8526.—*Improvement in Railroad Car Wheels.*

What I claim as my invention, and desire to secure by letters patent, is connecting the tread or rim of a car-wheel to the hub or central part thereof by means of India rubber, or other analogous elastic material, such elastic material being connected with the outer periphery of the central part of the wheel by a groove on the latter, or its equivalent, and to the inner periphery of the rim, also, by a groove thereon, or its equivalent; the India rubber holding itself in both grooves by its elasticity,

and giving to the wheel lateral as well as radial elasticity, as herein described.

I also claim the grooved segments, constructed substantially as herein described, and interposed between the India rubber and the rim, for the purpose of facilitating the insertion of the India rubber into the space between the rim and central part of the wheel, and its removal therefrom, as herein set forth.

NEHEMIAH HODGE.

No. 8527.—*Improvements in Mill for Grinding and Bolting.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is—

First. The grinding of grain, or other material, by means of a revolving stone, or metallic roller, and one, two, or more separately adjustable concaves, whereby "high and low" grinding may be performed simultaneously, and bolting the same the instant that any particles are ground fine enough, in combination with the returning on to the roller again all particles too coarse to be bolted through the bolting concave, so that they may be ground over again and again, until they are fine enough to be discharged; and this I claim, whether it is done by means of the revolving beaters and brushes, which throw it up and through the pipe, or by any other means essentially the same.

Second. I claim the guides or partitions in the pipe, as herein described, to prevent meal from scattering endwise in its transit from the bolting concave to the roller, in combination with the adjustable aprons, A, on which it falls, and which distribute and govern it in its passage to the discharging end, as herein described and set forth.

JEHU HOLLINGSWORTH.

No. 8528.—*Improvement in Cannon for throwing Chain Shot.*

Having thus fully described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is in combination with the revolving head, S, and the bores, B, B, diverging as described, the rack, C, attached to the gun, and the worm-wheel, D, hung on the shaft, E, by which the gun is made to revolve or turn to the desired position, so that the chain-shot may be thrown either in a horizontal or vertical line.

ADAM LEMMER.

No. 8529.—*Improved Screw Propeller.*

And having now described the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim as my invention, and desire to secure by letters patent, is arranging two or more series of narrow blades, such as above described, each series on a separate shaft, and the shafts one within the other, and provided with keys, or other equivalent means of securing them to each other, substantially as specified, so that the two or more shafts may be turned on each other, and resecured, to place the series of vanes directly behind each other for sailing purposes, and at different points of the circle for propelling.

G. MALO.

No. 8530.—*Improvement in Desks.*

What we claim as our invention, and desire to secure by letters patent, is—

First. Forming the desk-top in boxes, parts, or pieces, D, E, each of which may be separately raised or lowered, as required, through appropriate mechanical devices, substantially in the manner and for the purposes shown and set forth.

Second. The employment of hinged double leaves, F, G, in the front of the desk, the same, when extended, forming a rest for the hand, and being made capable of closing down or in, essentially as described.

ISAAC H. NORRIS,
DAVID FLANDERS.

No. 8531.—*Improvements in Railroad Switch.*

Having thus described my invention and improvements in the self-adjusting and locking switch for railroads, I wish it to be understood that I am aware that the relative position of the switch with the main track, or turn-out, or sideling track, has been changed by the action of mechanism attached to the cars, as well as by devices attached to the locomotive, in various ways; and therefore I do not claim changing the switch by apparatus or devices actuated by the cars or locomotive; nor do I claim constructing and operating a switch composed of a single movable section of the main rail; but what I do claim as my invention and improvement, and desire to secure by letters patent, is the employment of the additional movable sections, D, D, in combination with the sections, C, C', forming the switch, whereby the lateral movement of each is halved or divided, in opposite directions, and a more regular curve is produced than that resulting from the use of the single movable section or switch, and thereby insuring safety, the weight of the train of cars on one section of the switch forming a lock to the other section, as one section cannot move without the other, till the train of cars shall have passed therefrom, as herein fully set forth.

I also claim the combination of the double central lever bars, A, B, A. B, with the central connecting rock shaft, E, having two cranks, *f*, projecting in opposite directions, to which are attached the cross bars, *g*, *g*², for uniting the double sections, D, C, C', whereby the switch is adjusted, as fully set forth and shown in the accompanying drawings.

D. F. PHILLIPS.

No. 8532.—*Improvement in Seed Planters.*

Having thus fully described my invention, what I claim as new, and desire to secure by letters patent, is the combination of the slides, *f*, *g*, with the grooves, *a*, (which "drill in" the grain,) and the cells, *c*, *e*, so that by moving the slats, *f*, towards the centre of the hopper to close the communication with the grooves, and open it with the cells, *c*, for planting in "check rows," or by moving both the slats, *f*, *g*, towards the centre of the hopper, to close the communication between said hopper and the grooves, *a*, and cells, *c*, and open it with the cells, *e*, for planting in "step rows;" the whole being arranged in the manner and for the purpose herein set forth and fully shown.

WILLIAM REDICK.

No. 8533.—*Improvement in inserting Porcelain Teeth.*

What I claim as my invention, and desire to secure by letters patent, is the mode of inserting teeth by forming the concave base, and of inserting the platina pins into the base of the platina surface of the teeth, in an oblique direction, and attaching them to the gum plates without stays.

W. WILLSHIRE RILEY.

No. 8534.—*Improvement in Stoves.*

What I claim as my invention, and desire to secure by letters patent, is placing the damper, F, between the fire and hot air flues, B and E, so as to control the amount of opening in each respectively, and governing the same by the expansion of the rod, d, substantially as herein described, for the purpose of regulating the heat of the oven.

I do not claim the expanding rod, d, irrespective of its connexion with the damper, placed as described.

H. R. ROSE.

No. 8535.—*Improvement in Stove Grates.*

Having thus fully described my new and improved fire chamber for stoves, &c., what I claim therein as new, and for which I desire to secure letters patent, is the inclined elevator, E, for raising the back grate, and coupling it with the front grate, and in combination the connecting the front and back grates with hooks or catches, constructed and arranged substantially as above specified.

H. J. RUGGLES.

No. 8536.—*Improvement in Spring Saddles.*

What I claim as my invention, and desire to secure by letters patent, is the movable pommel, the spiral spring, or springs, connecting the pommel and cantle, and the raw hide seat, all combined, substantially in the manner herein set forth, making a spring-seat saddle tree.

JOHN C. FR. SALOMON.

No. 8537.—*Improvement in Gongs.*

What I claim as my invention, and desire to secure by letters patent, is making gongs of sheet or plate iron, or steel, with a rim, B, all round, strengthened by a ring or band, C, the whole being coated, and having the crevices, interstices, and all unsound parts filled with an alloy of copper and tin, or any alloy of a similar nature, or composed of similar metals to what is usually called "bell metal, substantially as herein set forth.

VINE B. STAR.

No. 8538.—*Improvement in finishing and balancing Mill Stones.*

What I claim as my invention, and desire to secure by letters patent, is the inserting the balance rine in the eye of a mill-stone in the early

stage of its construction, and then making use of the said balance-rine, in conjunction with a chuck, combined with the spindle, in completing the stone, substantially as herein set forth.

GEORGE TODD.

No. 8539.—*Improvement in Wires for making pile in Woven Fabrics.*

What I claim as my invention, and desire to secure by letters patent, is combining with the flat pile or figuring wire employed in weaving looped or piled fabrics, and attached to, or near one end thereof, a weight, for the purpose and in the manner substantially as described.

E. B. BIGELOW.

No. 8540.—*Improvement in Fastenings for Garments.*

Having thus described my improved mode of fastening garments, &c., I shall state my claim as follows: What I claim as my invention, and desire to have secured to me by letters patent, is the opening, closing, and fastening together the two sides of a garment, or other article, by means of the clasps and ribs, operating in combination, substantially in the manner hereinabove described.

I also claim the method of connecting the clasps one to the other, in pairs, and in the series of pairs, by the links, cord, and beads, substantially in the manner hereinabove set forth.

ELIAS HOWE, JR.

No. 8541.—*Improvement in Cooking Stoves.*

Having thus fully, clearly, and exactly described and represented my improvements in stoves, what I claim therein as new, and desire to secure by letters patent, are the diving flues (*i*) opening from the floor, as described, and, in combination with this, the chamber (*g*;) for the purpose described.

HOSEA H. HUNTLEY.

No. 8542.—*Improvement in Cooking Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the employment of the three movable plates, C, D, E, constructed and arranged as described, viz: the plate, E, being hollow and affording a passage or flue, when not cut off by the damper, through which the heat passes, warming the ovens formed by the plates, the plates being capable of being withdrawn from the stove, or varied in a vertical position, by which arrangement the stove can be converted into an air-tight, or draught wood, or coal cooking stove, cooking range, or a wood, or coal, draught, or air-tight radiating stove, or into a Franklin stove, substantially as set forth.

GEO. W. CARLETON.

No. 8543.—*Improved Safety Apparatus for Steam Boilers.*

First. We claim as our invention, and desire to secure by letters patent, the bent tube, formed and arranged substantially as described.

to contain mercury, in combination with the lever of the safety valve, or its equivalent, and connected with the steam boiler by means of a swivel and a pillar connexion, or its equivalent, whereby the varying pressure of steam varies the actual weight upon the valve.

Second. We also claim the combination of the connecting rod, Q, and the lever, O, I, and the shaft, R, for connecting the mercurial gauge, T, T, and U, with the catch box, N, and projecture, O, on the catch box, whereby the mercury in the gauge, T, T, being the weight, holds down the safety valve, or sets it at liberty, by the pressure of steam from the pillar, E, and swivel, S, S, said pillar being supplied with steam from the boiler or boilers, as described in the specifications.

Third. We also claim the combination of the rod, M, with the spiral spring upon it, and small pulley at the top of it, with the notched pulley, L, for holding the catch box together so long as the full part of the pulley, L, is on the small pulley, or setting it at liberty when that part of the pulley that is cut out comes opposite the small pulley, and thereby allowing it to ascend, as described in the specifications.

JONATHAN COLLINS,
JOHN J. G. COLLINS.

No. 8544.—*Improvement in Ploughs.*

What I claim as my invention, and desire to secure by letters patent—

First. Is the cutter, C⁴, or its equivalent, to separate the sward for the first furrow at a proper distance from the coulter, acted upon by the prop, a³, and lever, C⁵, or their equivalents.

Second. Is the piece, D³, fastened to the heel of the mould-board in combination with the cutter, C⁴, to turn wide furrows.

Third. Is the mode of connecting the tongue and plough, respectively, to the axle, by means of the links and the loose tenon on the tongue, substantially as described, so as to allow the team to walk entirely aside from the furrow, or direct course of the plough, in ploughing prairie, marsh, or other land with soft under strata, and make the plough run smoothly and work well, and so as also to enable the ploughman to take an extraordinarily wide furrow, with one member of the team walking in the furrow with a common yoke, thus dispensing with the long yoke now commonly used for that purpose.

Fourth. Is the rope, D, and lever, D', or their equivalents, in combination with the mode of connecting the tongue and plough to the axle, substantially as described, for the purposes set forth in the within specification.

ELIJAH GOLDTHAIT.

No. 8545.—*Improvement in Centrifugal Sugar Drainers.*

I would now state that what I claim, and desire to secure by letters patent, is centrifugal machines for separating fluid from other matter, constructed and operating as herein set forth, with detachable vessels containing the substance to be operated upon, irrespective of the exact mode of attachment, their number of vessels used, or the form.

DANIEL KING.

No. 8546.—*Improved Method of Operating Rudders.*

Having thus fully described our invention, we will proceed to state what we claim as new, and desire by letters patent: We claim controlling the operation of the rudders in such a manner as to bring either into operation while the other is stationary, by means of the pins or studs, *h, h'*, on their tillers, in combination with the grooves or slots, *g, g'*, in a wheel or disk, *G*, receiving motion upon an axis, *f*, or by the equivalents of the same, substantially as therein described.

THOMAS H. MORTIMER,
JAMES M. GARDNER.

No. 8547.—*Improvement in the manufacture of Door Knobs.*

I claim the combination and arrangement of the arms, sliding-plate, springs, and lever, substantially as described, operating in the manner, or in any analogous way, for the purpose set forth.

ORRIN NEWTON.

No. 8548.—*Improvements in Drop Presses.*

What I do claim as my invention, and desire to secure by letters patent, is the general arrangement and combination of the crank and shaft with its sweeps, moving always in the same direction with the moving gear, or pulley, and the ratchet wheel, joined together and running loose upon the shaft, constantly in the same direction, substantially as I combine them, for the purposes herein described.

I also claim the lock, in combination with its sweep and springs, and with the crank, to stop its motion not too abruptly, and to hold it until it is unlocked by the hand or foot of the workman, substantially as described.

MILO PECK.

No. 8549.—*Improvement in Cider Mills.*

Having thus described the portable cider mill, I wish it to be understood that I make no claim to originality of invention to any part of the mill, separately considered; nor do I claim as new any part of the arrangement of the press grinding cylinder or hopper. But what I do claim as new is—

First. The arrangement of the parallel slicing knives, *D*, in combination with the reciprocating follower, *G*, made as described, with channels and ribs on its inclined face, when used with a grinding cylinder, *Y*, and concave, *T*, made and arranged as described and represented, for first slicing the apples, and then delivering the slices successively to the grinding cylinder, *Y*, to be reduced to pummace in the manner herein described.

D. F. PHILLIPS.

No. 8550.—*Improvement in Shingle Machines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The peculiar form and mode of adjusting of the riving plate *E*, the same being self-adjusting, by means of the spring, *F*, upon which

it rests, and the end of the plate contiguous to the riving knife, being bent upward, (to accommodate irregularities in the grain of the shingle timber,) as herein specified.

Second. The employment (in combination with a shingle shaving machine) of the rolls, *T*, levers, *X*, *Z*, hanging rods, *X*, spring, *k*, and bent lever, *p*, or their equivalents, the whole being arranged and operated in the manner and for the purpose herein described: the levers, rod, and spring acting upon the rolls, and pressing them uniformly towards each other, for the purpose of unwinding or straightening the rived shingle, in the first instance, and the bent lever (being operated by the motion of the connecting rod, *R*, and acting upon the spring, *k*,) having the effect of increasing the force or pressure of the rolls upon the shingle, (as the latter passes between them,) for the purpose of preventing the splitting of the shingle in advance of the cutters as they approach the thin end of the shingle, as herein set forth.

FRANKLIN SKINNER.

No. 8551.—*Improved Valve for Oscillating Engines.*

I do not claim the circular valve, nor the manner of reversing the engine by turning the valve; but what I claim as my invention, and desire to secure by letters patent, is the arrangement of the piston valve with a ground face in a cylindrical steam chest, as described above, by which the necessity of packing about the trunnion and plummer block is avoided, consequently saving much friction in the trunnion.

WM. M. SMITH.

No. 8552.—*Improvement in Railroad Car Brakes.*

What I claim as my invention, and desire to secure by letters patent, is the combination and arrangement of the levers, link rods, and shoes, or rubbers, substantially as herein described, whereby each wheel of both trucks of a car is retarded with a uniform force when the brake is put into operation.

F. A. STEVENS.

No. 8553.—*Improvements in Looms for weaving Bags.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Placing the cams upon one or more shafts in such manner that they can be moved so as to change their relative position in regard to each other with or around the shaft, if upon separate shafts; or around the shaft, if upon the same shaft, in combination with the devices, substantially such as are herein described, or their equivalents, for releasing, changing, and holding said cams, as may be required, for the purposes set forth in the foregoing specification.

Second. Is the pin, *r*, on the spring, *f*¹, in combination with the pawl, *m*, or their equivalents, to force back the rod, *d*³, and propel the wheel, *I*, by the pin, *d*³, acting against the inclined sides of the notches, *h*², *h*³, so that the pin, *d*³, will fall back on the groove, *d*¹, and allow the wheel, *I*, to be propelled by the pin, *C*⁴.

CYRUS BALDWIN.

No. 8554.—*Improved Hand Drill.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the helical spring, F, with the screw, j, upon the drill shaft and the opening and closing nut, or screw-nippers, H, H, the whole being applied in the manner substantially as described, and operating for the purpose of controlling all the required movements of the drill in the line of the axis of its revolution, in giving it the pressure upon its work, controlling the said pressure, and withdrawing it from its work, as herein fully set forth.

WILLIAM BUSHNELL.

No. 8555.—*Improvements in Hurdle Fences.*

Having thus fully described my improved fence, what I claim therein, and desire to secure by letters patent, is the method of locking and supporting the same by means of the notched sills and lock braces, as herein described.

CYRUS C. COLE.

No. 8556.—*Improvement in Machines for crimping package papers for Soda Powders, &c.*

What I claim as my invention is the combination and arrangement of the surfaces, *t, u, v, w, x, p, b, a, c, d*, in the manner substantially as represented in the drawings, and for the purpose of folding the paper in a trough-like shape, and in other respects convenient for being filled with powder and folded together.

CARLOS A. COOK.

No. 8557.—*Improvement in Railroad Switches.*

Having thus described my invention and improvement, and pointed out the difference between the same and other railroad switches, what I claim therein as new, and desire to secure by letters patent, is—

First. The combination of the stationary single casting, *c*, with the single casting or switch, *g*, each having a guard on the inside thereof, whereby the said permanent single stationary casting, *c*, is made to subserve the purpose of the ordinary frog and auxiliary switch in connexion with the turn-out side of the main track as described.

Second. I also claim providing the movable casting, *g*, on the inside thereof with a guard, *m*, for the purpose of guiding the train of cars over the switch in a straight line when running in the direction of the arrow, *y*³, and thus prevent the cars from passing on to the turn-out rails when the switch is in the position shown in fig. 2, the projection or frog, *f*, being of sufficient length, in connexion with guard, *m*, to guide the train on to the main rail, *a*, as described.

WM. N. RAINES.

No. 8558.—*Apparatus for Propelling and Steering.*

I do not claim the peculiar wheel here used as a water wheel and propeller; but what I claim as my invention, and desire to secure by

letters patent, is the combination of the water ways in the rudder with a water wheel and submerged propeller, to be operated by hydraulic pressure, for propelling and steering vessels, substantially as herein set forth.

JOHN C. FR. SALOMON.

No. 8559.—*Improved Lock for Safes, &c.*

I do not claim the knobs, D, D, and collars, E, E, with the numbers on them, for the purpose of serving as indexes, as they have been previously used; neither do I claim a series of tumblers as those described, for these have also been previously used; but what I do claim as new, and desire to secure by letters patent, is the "tallon," N, with the stud, *q*, attached to it, in combination with a series of tumblers, O, having curved slots, *o*, in them; said tallon and tumblers operating as described, viz: the tallon being thrown up by the key during its second revolution, and the stud, *q*, in consequence, placed on the outer side of the tumblers, the tallon being held up by the catch, P, the catch, *y*, on the tallon bearing against the stump, *z*, and preventing the bolt from being moved back or withdrawn; the tallon, N, requiring to be let down, when the bolt is to be withdrawn, so that the stud, *q*, may work or slide in the curved slot, O, in the tumblers, and the catch, *y*, be free from the stump, *z*; the bit of the key, in turning, acting upon the end of the tallon, and shooting back the bolt, substantially as described.

F. C. GOFFIN.

No. 8560.—*Improvements in Railroad Car Trucks.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is hanging the frame of a six-wheeled truck immediately on the centres of the front and rear axles by a shank or socket, and to the centre axle by guides, in combination with horizontal, diagonal, or other bracing, connecting and operating said wheels so that they may adjust themselves to any lateral curvature in the track, and at the same time allow either of the sets of wheels to pass over any obstruction without raising the other sets from the track, and for the purpose, also, of allowing the set from which the weight is removed to still retain its position on the track for guiding the others, as herein fully set forth and described.

BENJ. HINKLEY.

No. 8561.—*Improvement in Steam Carriages for Railways.*

Now, we wish it distinctly understood that we do not claim the combination of a steam engine with the axles or body of a carriage; nor do we claim any arrangement of it by which it is directly applied to a "fixed" axle, or one so connected directly with the carriage body that, other than a rotary motion, it can have no horizontal and rocking movements, independently of the same; but what we do claim as our invention or improvement is the arrangement or arranging steam engine directly on a movable truck-frame of "a long car," or carriage, in combination with arranging the boiler, or steam generator, on or in the carriage body or frame, and connecting the engine and steam generator by a flexible

pipe, or pipe having a ball and socket, or other equivalent connexion or joint, such as will allow of all the necessary rotary and rocking movements of the truck frame and carriage body; the whole being substantially as hereinbefore described.

JOS. H. MOORE,
WM. P. PARROTT.

No. 8562.—*Improvement in Expanding Mandrels.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The use of an expanding nut or shell, D, formed in segments whose interior faces have portions of a screw thread cut thereon, which fit within, and correspond with, the thread of a taper screw, e, of the mandrel.

Second. The manner of holding together, or retaining in their places, the several segments, c, c c, of the expanding shell or nut, by means of a coiled spring, or springs, g, g, encircling the segments, and made of sufficient length to admit of the nut expanding without destroying the confinement or hold of the segments, as described.

WALTER SHERROD.

No. 8563.—*Improvements in Machines for Stretching and Drying Cloth.*

What I claim as my invention is the combination of the two winding and lengthwise stretching contrivances, or stretchers, the two widthwise rotary stretchers, C, D, and the three or any other suitable number of drying cylinders, E, F, G, substantially as described, so as to enable a person to cause a piece of cloth to pass in one direction over and around the drying cylinders, and next in the opposite direction, as many times as may be desirable, in order to stretch, dry, and finish the same to the extent that may be required.

THOMAS BARROWS.

No. 8564.—*Improvement in the mode of papering Pins.*

I do not claim the crimps that the pins are inserted through; neither do I claim rolling up the paper of pins from both ends to the centre, that being old and well known. But what I do claim as my invention, and desire to secure by letters patent, is the *new* mode of papering pins, substantially as herein described.

I claim the new manufacture of "book pins," formed by folding the paper in parallel folds at regular distances from each other, producing fan-like or zig-zag folds, which allows the paper of pins to be closed into compact form, without rolling or winding, for the purposes herein set forth.

C. O. CROSBY.

No. 8565.—*Improvement in Machines for Working Clay.*

What we claim as our invention is—

First. The fixed double eccentric cams, I, I, in combination with the pitmans, J, J', attached to the slides, K, K', and by means of L, L', giv-

ing motion to the pawls, M, M', and through them to the rack, Q, and the wheel, E, for the purposes herein set forth and described.

Second. We claim the particular arrangement and combination of machinery set forth and described in figs. 2, 3, and 4, in combination with the tempering wheel, E, fig. 1, especially the double eccentric, I, I, and the pitmans or connecting rods, J and J', the slides, K and K', with the pawls, M, M', the connecting bar, O, the shifting rod, P, and the rack, Q, as applied to tempering clay for making brick, or any other purpose, or any equivalent device or arrangement of machinery for accomplishing the same purpose substantially in the same manner.

DANIEL DUCHEMIN,
GEORGE DUCHEMIN.

No. 8566.—*Improvement in Tailors' Measures.*

What I claim as my invention, and desire to secure by letters patent, is the gauge designated by the letters A and S in the drawings. This gauge has two arms slit through the centre, from the cross bar down, as illustrated by fig. 1 in the drawings; the front arm extends up and forms a semi-circle over and around the top of the inner arm. This semi-circle is slit through the centre, and forms a way for the two shoulder straps, which are attached by a pivot to the top of the inner arm to turn on, with screws to set them to the desired place; the semi-circle is designated by the letter D in the drawings. This gauge moves horizontally on strap E, from the front backward, or *vice versa*, until it strikes the front of the arm-hole and locates the same, and is set by screws to the desired place. Again, this gauge can be drawn perpendicularly, so as to increase the length of the shoulders for a very full-breasted man, or contracted, so as to fit a hollow-breasted man.

JAMES MAGINNIS.

No. 8567.—*Improvement in winding Watches.*

What I claim as my invention, and desire to secure by letters patent, is the application to watches of the machine keys, substantially as herein described and illustrated by the accompanying drawings, which keys and their boxes are enclosed by the watch case, and form a part of the watch, rendering the use of ordinary watch key unnecessary, without the expense and great friction of the complicated machinery heretofore used for the same object.

THEODORE NOEL.

No. 8568.—*Improvement in Carriage Perches.*

What I claim as my invention, and desire to secure by letters patent, is constructing the front extremity of the perch so as to form a spindle, which passes through a tube on the turning plate, to connect it with the front axletree, and at the same time to form a hinge on which the front axletree can rock, the latter being a new duty additional to that which the forward extremity of the perch has heretofore performed, thus increasing the efficiency without increasing the complexity or cost of the coupling.

LEWIS E. STILWILL.

No. 8569.—*Improvements in Machines for boring holes in Posts*

Having thus described my improvements on the machine for boring holes in posts for fencing, what I claim therein as new, and desire to secure by letters patent, is combining the pivoted bar, R, provided with a catch and inclined plate, S, T, and long arm, V, and stop or pin, *p*, with the gauge bar, U, provided with rows of pins, *q*, and mounted in bearings in the inclined carriage, G, whereby the movement of the latter is regulated in moving the timber laterally in boring a series of holes, as described in the specification.

I also claim the combination of the pivoted beam, P, inclined plane, *b*, inverse half nut screw, *f*, and propelling screw shaft, M, whereby the carriages are made to advance toward the boring tool, and is disengaged for the purpose and in the manner described and represented.

I do not, however, intend to confine my claim to the precise construction described in the foregoing specification, but to use such a form of construction as may be the best adapted to accomplish the desired object by means substantially the same; neither do I claim any portion of the machine above described that has been practised successfully by others prior to its being invented by myself.

THOMAS T. STRODE.

No. 8570.—*Improved Foundry Apparatus.*

Having thus described my improvements in the art of founding, what I claim therein as new, and desire to secure by letters patent, is—

First. The method of making moulds for castings by impressing the pattern into a measured quantity of sand, contained in a flask constructed with steps, or protuberances, and depressions, substantially as herein described, so that the mould, when finished, may be surrounded by sand, varying in thickness in proportion to the different degrees of compression which it receives by the impression of the pattern, in order that the density or hardness of the face of the mould may be rendered more uniform, substantially as herein set forth.

Second. I claim the method of charging the half flask with the requisite quantity of sand to form a half mould by surmounting said flask with a hopper, and passing the two to and fro beneath a sand-box, substantially as herein described.

Third. I claim the method of detaching the hopper from the flask after the mould is formed, and of applying it thereto before the sand is introduced, substantially as herein described.

Fourth. I claim the method of applying facing sand to the flask prior to the formation of the mould, by means of apparatus operating substantially as herein described.

Fifth. I claim the method of tempering, distributing, and sifting moulding sand by means of machinery, operating substantially as herein described.

Sixth. I claim the core spindle, constructed substantially as herein described.

Seventh. I claim the method of filling a series of flasks with melted metal by a single sprue by means of a sprue case, with which the flasks are connected, substantially as herein set forth.

Eighth. I claim the combination of apparatus for tempering the moulding sand, apparatus for distributing the tempered sand and sifting it into the sand reservoir, and apparatus for supplying to the flask a measured quantity of sand from the reservoir, with a flask and pressing apparatus, whereby the sand is worked and the mould produced by machinery, operating substantially as herein set forth.

CHAPMAN WARNER.

No. 8571.—*Improvement in Running Gear of Locomotives.*

What I claim as my invention, and desire to secure by letters patent, is the use of steam springs for the support of the weight carried by the driving wheels of a locomotive engine, in combination with bearing or supporting wheels placed both before and behind the aforesaid driving wheels, which bearing wheels support a portion of the weight of the engine, through the medium of steel, air, India-rubber, or other springs possessing the properties herein described, as belonging to steel springs, as distinguished from steam springs, for the purpose set forth in the specification.

I also claim the employment of steam springs, or steam pressure, operating separately from the propelling cylinders, for the purpose of varying the pressure of the driving wheels of a locomotive engine upon the rails of the road, in combination with bearing or supporting wheels placed both before and behind the aforesaid driving wheels, which bearing wheels support a portion of the weight of the engine, through the medium of steel, air, India-rubber, or other springs possessing the properties herein described, belonging to steel springs, as distinguished from steam springs, for the purpose set forth in the specification.

ROSS WINANS.

No. 8572.—*Improvement in Apparatus for opening and closing Gates.*

Having thus described my improved gate, what I claim therein as my invention, and desire to secure by letters patent, is making a blank space on the lever, *o*, and vibrating it so far as to disengage the cogs upon it from the cogs upon the plate, *l*, so that the gate may be opened and closed by persons on foot without the aid and without operating the lever, *o*, in combination with the connecting of the bar, *r*, (or latch) to the lever, *o*, by the rope, *g*, so as to unlatch the gate when the lever, *o*, vibrates before the cogs on the lever, *o*, gear into the cogs upon the plate, *l*, to open the gate, substantially as described.

ENOCH WOOLMAN.

No. 8573.—*Improved Revolving Reverberatory Furnace.*

What I claim as my invention, and desire to secure by letters patent, is the rolling or revolving furnace, revolving on friction wheels, or rollers, or their equivalent, in combination with an ordinary fire, such as is used in reverberatory furnaces, the two being combined in such a manner that the products of combustion, heated gases, &c., from the grate shall pass into the interior of said rolling or revolving furnace, sub-

stantially as herein described, said rolling or revolving furnace being applicable to any purpose for which ordinary reverberatory or wind furnaces are employed.

AMBROSE S. BEADLESTON.

No. 8574.—*Improvement in Potato Diggers.*

What I claim as of my own invention, and desire to secure by letters patent of the United States, is the arrangement and combination of the cutting and digging cylinders with the riddles, in the manner herein set forth.

DANIEL D. BELL.

No. 8575.—*Improvement in construction of Sounding Boards for Musical Instruments.*

What I claim as my invention, and desire to secure by letters patent, is the above-described mode of constructing the sounding-boards of stringed instruments by combining or arranging together any suitable number of pieces of wood prepared as above, all in manner and for the purpose as herein set forth.

CORNELIUS BOGART.

No. 8576.—*Improvement in Running Gear of Railroad Cars.*

What I claim as new and original, and desire to secure by letters patent, is adapting to each side of railroad car trucks four or more wheels, attached to a frame-work, inflexible vertically, but with a horizontal motion, in such manner that in case of depressions in the rails at their joinings, or otherwise, they (the wheels) will alternately, by couplets, triplets, or the like, receive the weight of the load above, and relieve the wheel passing over the depression from the weight of the load and frame-work, so that no concussive blow is struck with that weight, or jar created, substantially as above described.

THOMAS A. DAVIES.

No. 8577.—*Improved Carbonic Acid Gas Engine.*

I do not claim the invention of carbonic acid gas in its liquified or æriform character as a motive power; neither do I claim the use of the hydrostatic press for liquifying the gas, as these principles have long been known and commented upon by Sir Hy. Davy, Faraday, Brunnel, and others. But what I claim as my invention, and desire to secure by letters patent, is—

First. A carbonic acid gas engine, in which said fluid passes from a reservoir, where it exists in a liquid state, through suitable valves, into a heated cylinder, thence into a refrigerator, where it is cooled, and thence through pumps, where it is condensed by hydrostatic pressure, and forced back again to the reservoir before named; the said engine being constructed substantially as herein described.

Second. The combination of crimped leather washers, a spiral spring, or springs, and oil, or any lubricant, for packing the piston-rods, or plungers, as described.

JOHN C. FR. SALOMON.

No. 8578.—*Improvement in Gas Regulators.*

What I claim as my invention, and desire to secure by letters patent, is the closing of the valve, *d*, when the fluid becomes too low in the gas regulator for safety, by the movement of the float, *j*, and the lever, *i*, *h*, and their action upon the thimble, *l*, on the valve rod, *c*, substantially as herein set forth.

JONATHAN S. CONANT.

No. 8579.—*Improvements in Water Metres.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The uniform circular channel, *a*, *a*, in combination with the contracted channel, *b*.

Second. I claim the rotating paddle-wheel, having paddles projecting into and working in the said uniform and contracted channels.

Third. I claim the apertures, *m* and *n*, proportioned and formed as described.

Fourth. I claim the pipe, *q*, with its jet, *r*, for giving motion to the paddle-wheel before the fluid enters through the aperture, *m*.

Fifth. I claim the valve, *k*, by which any desirable power of jet may be obtained before any fluid enters through *m*.

J. ERICSSON.

No. 8580.—*Improvement in Chucks for Lathes.*

Having thus described my improved chuck, what I claim therein as new, and desire to secure by letters patent, is the mechanism, herein described, or the equivalent thereof, for connecting and disconnecting at will the whole or any part of the screws which operate the gripping jaws, with the wheel which turns them, so that the screws and jaws may be moved either separately or in connexion, or in part separate and in part connected, whereby objects of either regular or irregular shape may be chucked, either eccentrically or concentrically with the axis of the mandrel, substantially as herein described.

I also claim the turning plate (I) of the chuck, constructed with a cog-wheel on its inner face, made in segments, part of which can be withdrawn out of gear with the pinions on the carrier screws, or held in gear therewith by means of set screws and springs, or the equivalent thereof, substantially as herein set forth.

JOSEPH HYDE.

No. 8581.—*Improvement in Feeding Logs in Saw Mills.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the combination of any number of adjustable rollers, *F*, which may be set at any angle with the feed rollers, *Q*, or with each other, for the purpose of feeding up the log, so that it may be cut with the curve or grain of the wood, substantially in the manner herein set forth and described.

CHARLES KETCHAM.

No. 8582.—*Improved arrangement of Pans for washing Ores, Minerals, &c.*

I do not claim the device of arranging a movable pan in a vibrating frame, and of operating the same, so as to give a double motion to the pan, since letters patent for this invention have been granted to Arnold Buffum and Philip Thorp.

What I claim as my invention, and desire to secure by letters patent, is the arranging and operating of a series of ore-washing pans, or sets of pans, in a vibrating frame, said pans, or sets of pans, having also an oscillating or rocking motion in the frame, in such a manner that, as the superficial portion of the contents passes freely from any one pan or set of the series into the next, the contents shall at the same time pass out of the latter less freely, or not at all, and *vice versa*, substantially as already described.

Second. I claim also the arranging in a vibrating frame of a series of pans, or sets of pans, one after the other, each pan, or set, being hung upon the frame by a separate axle, or equivalent attachment, and secured in its working position by a catch, or other equivalent means, in such a manner that each pan, or set, may be conveniently disconnected and tilted, so as to discharge its whole contents into a receptacle separate from those of the other pans.

Third. I claim also the arranging of a succession of groups of pans by a constant duplication for the subdivision of the contents in such a manner that the contents issuing from each pan of any one group, the last excepted, shall pass, by an equal division, into two pans of the next succeeding group, substantially as described.

SAMUEL PORTER.

No. 8583.—*Improvement in Car Seats.*

Having thus described the nature of our invention, what we claim as new, and desire to secure by letters patent, is the arrangement of the reversing arms, A, A, pivoted midway the height of and to the back, so as that they shall descend and slide through the pivot rollers, so as that any required height of back may be reversed from one side of the seat to the other, in the manner and for the purpose substantially the same as described.

EZRA RIPLEY,
E. L. BRUNDAGE.

No. 8584.—*Improvements in Lath Machines.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is so arranging the frame that carries the reciprocating or chopping knives and feeding apparatus as that, whilst cutting, it shall at all times rest by its own weight on the bolt or log, in advance of the portion thereof which is being cut, in combination with the mode, as herein described, of giving to the knives carried in said frame an alternating drawing movement towards and from the log, independent of the downward motion or position of the frame, by which means the block may be entirely reduced to laths,

while the whole weight of the knife frame is resting on it to keep it firm and solid.

I also claim, in combination with the cutter stock, the feeding plates for feeding up the log to the cutters, a "throw" being given to said stock for that purpose; and this I claim, whether the same is accomplished by the means herein specially set forth, or by any other means essentially the same.

G. W. TOLHURST.

No. 8585.—*Improvement in Chair Seats.*

What I claim as my invention, and desire to secure by letters patent, is the above combination of the frame and web, being the mode of securing the web to the frame, as herein set forth, by gluing or cementing the web into a groove in the frame.

JOHN W. DRUMMOND.

No. 8586.—*Improvement in Weavers' Temples.*

What we claim as our invention, and desire to secure by letters patent, is the roller temple, constructed as herein set forth; the roller working in a concave, so that the cloth is held at that line of the periphery of the roller which is nearest the reed, at which line the roller is enabled to perform its duty with the greatest efficiency.

ELIHU DUTCHER,
WARREN W. DUTCHER.

No. 8587.—*Improvement in combining Organs and Piano Fortes.*

I do not claim combining the organ and piano forte, irrespective of the manner in which the combination is formed; but what I claim as my invention, and desire to secure by letters patent, is—

First. The whole or any number of the tubes of an organ, with a distinct set of keys, in combination with a piano forte having its own proper set of keys, in such a manner that either the piano forte or organ can be played separately, or both at the same time, by the two sets of keys; or both coupled and played by one set of keys, by means of couplers, P or O, and eccentric bars, *h, j*, or other equivalent devices, substantially as herein described.

Second. Coupling either or both the organ and piano with a pedal action, R, *n*, Q, and uncoupling them from it by means of couplers, T, U, acting on the keys and eccentric bars, *t, w*, or their equivalents, so that either the organ and piano forte, or both, can be played upon by the pedals, substantially as herein set forth.

RICHARD M. FERRIS.

No. 8588.—*Improvement in Carriages.*

What I do claim as my invention, and desire to secure by letters patent, is—

First. The employment of segments, *c, d*, and fifth wheels, F, G, (or parts corresponding thereto,) attached as described; the one segment, *d*,

and fifth wheel, F, working on pivots, *f*, *n*, secured at points between the front and hind axle, such parts acting in combination with arms, *j*, *p*, constructed substantially as shown and described, for coupling the movement of two axles, or their turning appurtenances, for the purposes set forth.

GUSTAVUS L. HAUSSKNECHT.

No. 8589.—*Machinery for making Kettles and articles of like character from disks of metal.*

I do not claim any of the gear wheels or pinions, nor their arrangement, except as hereafter set forth, some of these being common in ordinary lathes; but I do claim as new, and desire to secure by letters patent of the United States—

First. The application of a rotary metallic form, or mould, or successive forms or moulds, in combination with a proper tool or tools, roller or rollers, sustained, moved, and directed in a proper path by competent mechanical means, for the purpose of operating on a disk, blank, or plate of metal, so as to reduce it gradually from the centre to the edge, at the same time forming it with straight sides, by successive stages, into a complete kettle, or into any similar articles, to the forming of which this apparatus can be applied, substantially as described and shown.

Second. The construction of the mandrel, *f*, 3, part of which is cylindrical and part fitted with a short screw, 13, to take the screw of the hand-wheel, *f*, 2, so that great pressure may be made at the point desired, while at the same time the mandrel can be easily and quickly moved through a long distance, for the purposes and as described and shown.

HIRAM W. HAYDEN.

No. 8590.—*Improvement in Adjusting Lenses.*

We do not claim to be the inventors of any of the parts herein described and shown; neither do we mean to limit the application of these means to cameras, but to use the same to adjust the focal distance of lenses in optical instruments wherever the same may be made available. What we claim as new, and of our own invention, and desire to secure by letters patent of the United States, is the combination of the pin, 2, spring, *f*, and groove, 1, with the cylinders, *a* and *b*, for the purposes and as described and shown.

WILLIAM LEWIS,
W. H. LEWIS.

No. 8591.—*Improvement in Stethoscopes.*

What I claim as my invention, and desire to secure by letters patent, is the double branch, C, C, connected with the main trunk, *a*, so as to enable persons to use both ears simultaneously, substantially as herein set forth and described.

NATHAN B. MARSH, M. D.

No. 8592.—*Improvement in Mineral Composition resembling Jasper.*

What I claim as my invention, and desire to secure by letters patent, is the manufacture of a mineral composition, having the external characters above described, by the fusion of clay with alkali, soda, lime, and sulphate of copper, as above described, or their equivalents, and working the composition into articles of utility and ornament, in the manner above described.

JOHN PAIGE PEPPER.

No. 8593.—*Improvements in Rotating Tumbler Locks.*

We do not claim a combination of geared-change wheels and notched circular plates, applied together on one common arbor, so that the said change wheels and circular plates shall lay side by side on the said arbor, by which arrangement of them they require to be removed from the arbor, in order to change the catch of any one wheel from any notch or hole of its circular plate into any other of the notches or holes of the said plate; but what we do claim as our invention is combining with the rotary tumblers and the change gears (arranged as set forth) the projection or tooth, *r*, or its mechanical equivalent, and the sliding frame, *G*, or its equivalent, for holding and guiding the tumblers during their rotations, and for moving them out of or into connexion with the change gears, all substantially as hereinbefore specified.

And we also claim the arrangement of the tooth or bit, *c*, and the stud, *g*, on a sliding and turning shaft, in combination with the arrangement of the arm, *E*, and the tumblers, so that when a person tries to move the tumblers, he cannot get end-play on the bolt, and *vice versa*; and in combination with the change gears and the arbor, *e*, we claim the friction spring, or springs, *a'*, and plat, *b'*, for the purpose above described.

DAVID H. RICKARDS,
JOSEPH F. FLANDERS.

No. 8594.—*Improvement in Candlesticks.*

I do not claim the employment of a movable detached cork, or other elastic substance, over which a sliding socket is allowed to move; nor do I claim the employment of a sliding socket; but what I claim as my invention, and desire to secure by letters patent, is the employment in the sliding socket candlestick of elastic packing, attached to the standard of the candlestick, substantially in the manner described, whereby I am enabled to support the sliding socket, prevent the leaking of the grease, and also am not obliged to use so long a sliding socket as where a cork is inserted loose in the socket.

FRANCIS A. ROCKWELL.

No. 8595.—*Improvement in Chimney Caps.*

I do not claim either the arch, *B*, or the end plates, *c*, *c*, or the end plates, *a*, *a*, and *b*, *b*, irrespective of the devices in connexion with them.

But what I claim as my invention, and desire to secure by letters patent, is—

First. The flanges, *c, c*, applied to the arch, *B*, in combination with the end plates, *c, c*, substantially in the manner and for the purpose herein set forth.

Second. The inclined plates, *a, a*, and *b, b*, applied to the arch, *B*, substantially as and for the purposes specified.

CHARLES W. RUSSELL.

No. 8596.—*Improvement in Churns.*

Having thus described the nature of my invention and improvement, I wish it to be understood that I make no claim to originality of invention in any of the individual parts of the churn except the dasher, and this I claim only when it is constructed with inclined perforated paddles and tapered elbow tubes, *L*, combined, for directing the cream or milk upward, and also throwing it centrifugally against the ribs, *B*, and concave surface of the churn tub, *A*, during the operation of churning, in the peculiar manner herein set forth.

HENRY SKINNER.

No. 8597.—*Blind and Shutter Operator.*

Having thus fully described the nature of my improvements in window blind operators and fasteners, what I claim therein as new, and desire to secure by letters patent, is the combination of the extension handle (*k*) (provided with taper ends) with the lever (*h*) and the studs, (*j, j'*), or their equivalents, by which the handle can, by extension, be made to possess the requisite leverage, and by which, when the lever arrives at that position of its sweep corresponding to the required position of the blind or shutter, it is firmly secured in its position, and the handle placed out of the way by the latter being thrust home against the studs; the whole being arranged substantially in the manner described.

N. W. SPEERS.

No. 8598.—*Improvement in Apparatus for pressing Garments.*

Having thus described my improvements, I shall state my claims as follow:

What I claim as my invention, and desire to have secured to me by letters patent, is suspending the goose in a tailor's pressing machine from a carriage travelling on rails on the end of a vertical spindle; also, arranging said spindle so that it may be moved vertically, and swivel or turn upon its axis, substantially as hereinabove set forth.

I also claim arranging said goose upon the rod, passing through the forked end of said spindle, so that it may slide forward and back upon said rod, as hereinabove set forth.

Furthermore, I claim the combination of a goose, arranged substantially as hereinabove described, so as to move in the several directions specified, with a platform box, susceptible of adjustment, as specified and heated, substantially as hereinabove set forth.

JOSEPH W. THORP.

No. 8599.—*Improvement in Processes for Smelting Copper Ores.*

That which I claim as my invention and discovery, and for which I ask letters patent, is the use, as a flux, for ores combined with an excess of silica, of the sub silicate of iron, obtained from the second smelting, or from iron furnaces; the grinding of the regulus or mat to a powder, (instead of merely breaking it into lumps or fragments,) so that a perfect oxidation can be obtained, and leaching with water, which aids the oxidation, and extracts the sulphuric acid when generated, as that acid greatly retards the refining process when combined with the metallic copper.

SAMUEL F. TRACY.

No. 8600.—*Improvement in Tailors' Measures.*

What I claim as my invention, and desire to secure by letters patent, is the mode of cutting coats and vests by making all the principal parts to depend in length on the length of the breast measure, substantially as herein described.

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EDWARD × VIRTUE.
mark.

No. 8601.—*Improvement in Grain Sieves.*

What I claim as my invention, and desire to secure by letters patent, is forming sieves for separating grain from straw, chaff, and all extraneous matter, and for other analogous purposes, of sheet metal, with apertures, B, B, cut or otherwise, made in it, and inclined leaves, A, A, under the said apertures, of corresponding form with the apertures themselves, substantially as herein set forth.

THOS. B. WHEELER.

No. 8602.—*Improvement in Pumps for elevating Water mixed with Mineral Substances.*

I claim the improvement by which the waste, auriferous, or earthy water that leaks out of the shaft-hole of the case, A, is saved and returned into the body of the case, and the wear of the shaft hole of the chamber, *q*, prevented, the said improvement consisting in the chamber, *q*, the wheel, *r*, and the passage, *t*, as combined together, connected with the case, A, and the shaft of the fan-wheel, and made to operate substantially as specified.

WM. BALL.

No. 8603.—*Improvement in Chronometric Locks.*

Having thus described my improvements, I shall state my claim as follows—

What I claim as my invention, and desire to have secured to me by letters patent, is the manner of disengaging the drop lever from the notch of the bolt, from the outside of the partition, when the clock is stopped,

and preventing the same from being effected when the clock is in motion, by means of the lifting screw, in combination with the forked lever, swinging loop, and ratchet wheel, substantially in the manner above described.

WM. L. BASS.

No. 8604.—*Improved Machine for making Leather Tubes.*

Having thus described the construction and operation of my machinery for forming flexible tubes, what I claim as my invention, and desire to secure by letters patent, is—

First. The method of forming tube blanks, or sheets of the proper size and form for tubes, from leather, or other suitable material, by means of the movable and stationary nippers and inclined knife, or the equivalents thereof, operating automatically, substantially as herein set forth.

Second. I claim the method of forming flexible tubes from prepared sheets or blanks, by means of fingers, clamps, and cement, or their equivalents, acting substantially as herein set forth, to bring the edges of the sheet into contact, and to unite the same.

Third. I claim combining, in a single machine, the operations of forming the leather, or other material, into blanks, bringing the edges of the same into contact, and uniting them, so as to form a tube at a single operation, substantially as herein set forth.

Fourth. I claim the clamp, by means of which the material is held, and upon which it is formed into a tube, constructed and operating in such manner that it shall, in addition to its movements towards the other clamp, also have a longitudinal movement to withdraw from the finished tube, substantially as described.

Fifth. I claim the combination of the reciprocating, diverging fingers with the reciprocating converging plates, or their equivalents, by whose action the fingers are made to seize the sheet of material, substantially as herein set forth.

Sixth. I claim the method of coating the edge of the sheet with cement, by means of a roller, or its equivalent, which receives the cement and applies it to the edge to be cemented, substantially in the manner and for the purpose herein set forth.

Seventh. In combination with a clamp, or its equivalent, for supporting the edges of the sheet of material to be united, I claim a reciprocating pressing iron, actuated substantially as herein set forth, to press the edges together and to set the cement.

NEWELL WYLLYS.

No. 8605.—*Rotary Swaging Machine.*

What I claim as my invention, discovery, and improvement, is the compressing, drawing, swaging, or working into shape, wrought iron car wheels, and other metallic disks, by means of two dies, or swedges, suitably shaped, one of which is forced towards the other, while it at the same time revolves on its own centre, its axis of revolution being the same as that of the disk which is acted upon; the other die being either stationary or having a revolving motion in an opposite direction to that of the first-mentioned die, and with the same axis of revolution; the said

two dies, or swedges, operating substantially as described, and being moved by any competent arrangement of machinery substantially as described.

P. G. GARDINER.

No. 8606.—*Improvement in Suspenders.*

What I claim as my invention, and desire to secure by letters patent, is the fastening of those different parts of a suspender to each other which require a permanent fastening, by a metallic clasp or clamp, substantially in the manner and for the purposes hereinbefore described.

JULIUS HOTCHKISS.

No. 8607.—*Improvement in Candle-making Apparatus.*

Having thus described the nature of my invention, I do not wish to be understood as claiming the drawing the candles and suspending them above the moulds, whereby the latter are wicked for the casting of the next series of candles, this having been before done; but what I do claim, and desire to secure by letters patent, is the employment of grippers, D, D, for gripping the wicks, drawing and suspending the candles on the frame above the moulds, by means of spring bearings, by which the grippers are held firmly closed, and the candles are securely held and suspended until the next series of candles are moulded, when those suspended are cut from the wick and removed, in the manner and for the purpose described.

WILLIS HUMISTON.

No. 8608.—*Improvement in Æolian Attachments.*

What I claim as my invention, or improvement, is the combining with the valve stem, or rod, *a*, movable bar, *d*, or any equivalent mechanism, by which such valve stem, or the head thereof, whenever desirable, may be moved out of action with the key lever, for the purpose essentially as described.

GUSTAVUS W. INGALLS.

No. 8609.—*Improvement in Carriages.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the employment or use of the chain, C, and pulley, B, in combination with the dogs, F, G, and slide bar, D, constructed and operating in the manner and for the purpose substantially as set forth; the lower ends of the dogs being raised or depressed by means of the levers, M, M, L, L, operated upon by the square or loop, K, or any other equivalent device, and the slide bar, D, attached to or detached from the pole, E, by means of the levers, N, and pawl, O, operated upon by the bent lever, *p*, or their equivalents.

LEWIS KING.

No. 8610.—*Improvement in Harness Saddles.*

Having thus fully described my improved harness saddle, and the advantages thereof, what I claim therein as new, and desire to secure by

letters patent, is the sliding gauge hinge boxes attached to the pads, so as to adjust the width of the saddle by the screws, substantially as described.

I also claim the manner of attaching the sliding gauge hinge boxes to the pads by means of the housing between them and the top of the pad, and the set screws passing through the plate, *f*, and top of the pads, substantially as herein set forth.

JOHN McLAIN.

No. 8611.—*Improvement in method of hanging Window Sashes.*

I am aware that strips, acted upon by springs, have been placed in grooves in window sashes, and also in grooves in the casing for acting on the sashes, for the purpose of excluding air and for sustaining the sashes, when raised, in place of weights, and therefore I wish it to be understood that I do not claim the said arrangements as any part of my invention; but what I do claim as my invention, and desire to secure by letters patent, is the manner, herein described, of arranging and securing window sashes in their frames by means of grooves, *c*, *c*, in the sides (*C*) of the window frame (or casing) that receives the edges of the sashes, (or by projections from the sides of said frame, or casing, that fit it into grooves in the edges of the sashes,) and by making one or both sides of the window frame or casing movable and elastic by means of the springs, *a*, *a*, or their equivalents.

SAMUEL D. NIMS.

No. 8612.—*Improvements in Cutters for Planing Machines.*

We do not claim the formation of cutters by placing circular saws obliquely upon their arbors, as this has been done before; but what we do claim as our invention, and desire to secure by letters patent, is the constructing of a cutting instrument for operating upon lumber, of one or more elliptical shaped saw or saws, placed upon an arbor in positions so oblique to the direction of its axis as to bring every portion of the periphery of said saw or saws into the same perpendicular distance from the said axis of their arbor, by which the teeth of the said saw or saws are made to perform a combined rotary and laterally reciprocating cutting action in the same circle of rotation, substantially in the manner herein set forth.

JAS. M. PATTON,
WM. F. FERGUS.

No. 8613.—*Improvement in Apparatus for making Wrought Iron direct from the Ore.*

I do not wish to limit myself to the use of a puddling furnace for the final operation, nor to the use of mineral coal, as the same result in kind may be produced by a bloomery; what I claim as my invention, and desire to secure by letters patent, is the arrangement of a series of flat vertical tubes (or the equivalent thereof) in a vertical stack, substantially as described, when these are combined with a puddling or other furnace, substantially as described, by means of an interposed ore box, substantially as and for the purpose specified.

I also claim combining with each of the deoxidizing tubes, as described, and at the middle and near the lower end thereof, a double inclined plane, substantially as described, to insure the equal descent of the charge of ore, as described.

And I also claim, in combination with the series of deoxidizing tubes and the ore box, substantially as described, the employment of a series of stationary and a series of adjustable inclined planes, substantially as described, to regulate and insure the equal discharge of the ore from each and from the whole series of tubes, as described.

JAS. RENTON.

No. 8614.—*Improvement in method of setting up Ten-Pins.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is attaching the pins, D, to a disk or plate, I, by means of cords, (e,) in combination with the adjusting screen, E, and guide screens, G, H, by which the pins are properly adjusted or set up on the alley, A, upon raising and lowering the disk or plate, I, as described; the disk or plate being operated by means of the cord, K, passing over the pulleys (j) (k) and around the wheel, O, power being communicated to the shaft, (l,) or by any other mechanical means.

THOS. E. SHULL.

No. 8615.—*Improvement in Machines for counting Screws and Pins.*

What I claim as my invention, and desire to secure by letters patent, is the cylinder or wheel, formed with recesses in its periphery, for the reception of the screws, or other articles, to be counted, and provided with a groove for the reception of, and in combination with, the detector, to indicate, mark, and register the number of screws, or other articles, that are delivered; the whole being constructed and made to operate substantially in the manner specified.

THOS. J. SLOAN.

No. 8616.—*Improvements in Bolt-heading Machines.*

Having thus described my improved machine for heading bolts, what I claim therein as new, and desire to secure by letters patent, is the combination of the upsetting punch, the dies for shaping the sides of the head, the levers for working the dies, and the protuberance on the punch stock, for actuating the levers, so that, by the forward movement of the punch stock, the punch is caused to upset the end of the bolt, and, by its retrograde movement, the dies are worked, which give shape to the sides of the head, as herein set forth.

NATHAN STARKS.

No. 8617.—*Improvements in Spinning Rope Yarns.*

What I claim as my invention, and desire to secure by letters patent, is spinning rope yarns upon bobbins, having movable head or heads, so that the yarn can be packed tightly upon the bobbin in spinning, and,

after spinning, can be removed from the bobbin, to be transferred and hauled off into strands, for cordage, from the inner ends thereof, without unwinding, thus effecting a great saving of bobbins and labor.

R. SANDS TUCKER.

No. 8618.—*Improvement in Machines for Dressing Stone.*

Having thus fully described my improvements in cutting stone by machinery, what I claim therein as new, and for which I desire to secure letters patent, is the cylindrical tool holder, constructed and arranged substantially as herein set forth, so as to hold the tools or chisels and turn them in a direction to cut either way, keeping them in such position as always to receive the blows from the cams in the same relative direction, and also incidentally to support the cam shaft by means of the cams resting against its interior, should the cam shaft spring.

WILLIAM WHEELER.

No. 8619.—*Improvement in Machines for Ruling Paper.*

Having thus described our improvements, what we claim is, first, the shaft, S, and its projections, *d, d*, (operating as above set forth,) or any mechanical equivalent contrivances, in combination with the carrying apparatus, or endless tapes, P, P, &c., R, R, &c., on which the sheets are received, moved, and introduced to the action of the ruling apparatus, such carrying apparatus being made so as to operate essentially as above described.

And we also claim the shaft, U, and its lifters, in combination with the carrying apparatus, or endless strings, P, P, and the two sets of ruling apparatus, or contrivances, for supporting and ruling the paper on both sides, as described; such shaft and lifters, or the lifting apparatus, as it may be termed, being for the purpose of changing the overlap of the sheets, in manner as hereinbefore explained.

JOHN AMES,

GEORGE L. WRIGHT.

No. 8620.—*Improvements in attaching Cutters for cutting Screws or Rails of Bedsteads.*

Having thus described my improvement in securing V-shaped cutters in rotary cylinder heads, for cutting screws on tenons of bedstead rails, I wish it to be understood that all I claim as my invention, and desire to secure by letters patent, is forming an opening, A, in the end of the cylindrical head, B, so as to allow the cutter, C, to be placed therein laterally, or inserted into its seat sideways, and securely confined in the manner hereinbefore set forth, whereby the cutter, *c*, requires no adjustment, and is retained firmly in its position.

JACOB ZIMMER.

No. 8621.—*Improvement in setting Mineral Teeth.*

What I claim as my invention, and desire to secure by letters patent, is a new mode of setting mineral teeth on metallic plates, by means of a

fusible silicious cement, which forms an artificial gum, and which also unites single teeth to each other and to the plates upon which they are set.

I also claim to be the inventor of said cement or compound, a full and exact description of which is herein given.

I also claim the combination of asbestos with plaster of Paris, for covering the teeth and plates, for the purpose of sustaining them in their proper position while the cement is being fused.

JOHN ALLEN.

PATENTS REISSUED DURING THE YEAR 1851.

No. 184.—*Improvement in a Machine for bending or setting Felloes for the wheels of Carriages and Wagons.*

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as described, of bending felloes for carriages by means of a cylinder, upon which the felloe is bent, and a friction roller, or its equivalent, against which it is bent, substantially as described, when used in connexion with a strap for preventing the wood from splitting on its exterior surface, or otherwise.

EDWARD REYNOLDS.

No. 185.—*Improvements in Sofa Bedsteads.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the frames, D, D, which are of the same form as the sofa ends, F, F, with the said sofa ends, substantially in the manner and for the purpose as herein set forth, to wit: when the back, A, is elevated, to convert the sofa bed into a sofa, the frames, D, D, must be swung inwards against the sofa back, to retain it in an elevated position, and to throw the said frames out of the way and out of sight; and when it is desired to change the sofa bed from a sofa to a bed, the said frames, D, D, can only be swung outwards into a line with the sofa ends, F, F, so that the ledges, L, L, on the inner sides of the same will unerringly catch and retain the back, A, when it reaches a horizontal position as it is thrown backwards, in which position the sofa ends, F, F, and the swinging frames, D, D, will form an ornamental and uniform head and foot to the bed form of my improved sofa bed.

I also claim the placing of the pivots, *t, t*, which suspend the mattress frame, A, such a distance from the lower or inner edge of the same that when the said mattress frame is thrown backwards into a horizontal position the lower or inner edge of the mattress, A', will by that movement be thrown forwards and press against the rear edge of the mattress, B', with such force as to form a close and an elastic joint between the two, and thereby furnish an extra width to the bed form of my improved sofa bed, substantially in the manner herein set forth.

I also claim the projection of the mattress, A', below the pivots that it turns upon, in combination with the movement of the mattress, B', on hinges located at its front edge, by means of which a firm and close

joint is formed between the rear edge of the mattress, B', and the face of the mattress, A', when they are arranged in the form of a sofa, which joint aids in retaining the said mattress, A', in an elevated position, substantially as herein set forth.

RUSSELL SCARRITT.

No. 186.—*Improvement in Machines for folding Paper.*

What I claim as my invention, and desire to secure by letters patent, is the method of folding sheets of paper mechanically, by means of a reciprocating straight edge, or its equivalent, which strikes the sheet where the fold is to be made, and forces it into a recess, or space, between two surfaces, through which it can be delivered, in combination with a mechanism, which presents the sheet at the proper place and time, to make the fold or folds at the proper line or lines, substantially as described.

I also claim the method of completing the folds in sheets of paper, by passing them between converging surfaces, in combination with the method of forming the folds, substantially as described.

And, finally, I claim the moving surfaces of endless belts, or their equivalents, on which the sheets of paper are extended, and by which they are moved, in combination with the method of making and completing the folds, substantially in the manner specified.

EDWARD N. SMITH.

No. 187.—*Improvements in Machinery for making Mouldings.*

I do not claim to have invented parallel grooved feed-rollers to force in the material to be planed; but I do not know of any previous machine in which an angular roller has been applied, of either one or more conical rings or disks, that operate to feed material of varying angular forms into the machine by contact with the parts that have to be removed by the cutters; neither do I claim the rotary cutter for forming mouldings, nor a common moulding plane; but I do not know of any machine in which these two have been employed together—the cutter to give the shape, and the moulding plane to finish the surface. Therefore,

What I claim as new, and of my own invention, and desire to secure by letters patent of the United States, is the combination of the feed and pressure rollers, constructed and operating substantially as described, with one or more cutters or planes for giving the proper form or dressing to the moulding, when said combined parts operate upon material which has been sawed or cut, as nearly as may be convenient, into the general form of the moulding to be produced, as herein described, for the purpose of economizing the material or facilitating the operation.

ALFRED T. SERRELL.

No. 188.—*Improvements in Sewing Machines.*

Having thus fully described our improved sewing machine, we shall state our claim as follows:

What we claim as our invention, and desire to have secured to us by letters patent in the above-described rotary sewing machine, is arranging

the shuttle which carries the filling thread so that it shall revolve horizontally in a circular shuttle-race, said shuttle being constructed with a curved front and pointed nose, which shall travel in a circular guiding groove sunk below the bottom of said race, so that the shuttle shall inwardly pass through the loop formed in the needle thread; all as hereinabove set forth.

We also claim the pad or washer under the spring arms which carry the shuttle for keeping the filling thread straight, as hereinbefore explained. Furthermore, we claim the combination of the wide spring, c^1 , c^1 , and the bent lever-spring, f^1 , f^1 , operating as hereinabove described, or any contrivance substantially equivalent thereto, for relaxing the needle thread when the loop is to be formed, and holding it rigidly when each stitch is to be tightened, as hereinabove set forth.

We also claim the converging nipper springs through which the needle, &c., passes to keep the thread up, and prevent the needle from splitting or breaking it, as hereinabove set forth.

We also claim the combination and arrangement of the spring arms, q^1 , q^1 , q^1 , q^1 , with the cam ledge, s^1 , s^1 , or any other means essentially the same, for the purpose of disconnecting, alternately, said arms from the shuttle, for the purpose of allowing the shuttle to pass through the loop, as herein described and represented.

SHERBURN C. BLODGET,
JOHN A. LEROW.

No. 189.—*Improvement in Tanning Leather by Tannin and Acids.*

What I claim and desire to secure by letters patent, is—

First. The process of removing hair and wool from hides and skins, and of "liming" them, so called, preparatory to tanning, by the use of a composition of lime, wood ashes, or potash, and of salt, called composition No. 1, in the manner above described. I also claim the use of a composition of lime and wood ashes, or potash, without the salt; but I do not claim either of these materials separately by itself.

Second. The process of tanning hides and skins by the use of any kind of tannin, in combination either with the muriatic acid of commerce or with muriatic acid generated by a mixture of sulphuric acid and salt, in water, with the tannin, in the manner substantially as above described.

W. W. REID.

No. 190.—*Improved arrangement of Steam Boiler, and Furnace thereof.*

What I claim as my improvement in steam boilers, and desire to secure by letters patent, is the combination of a fire chamber and a water casing, the upper horizontal sections of both of which are greater than their lower, with a descending flue, the fire chamber and water casing being so arranged, with respect to each other, that the larger sections of the one adjoin the larger sections of the other, substantially in the manner and for the purposes herein set forth.

I likewise claim the injection of a jet or jets of air at the flues or passages which connect the combustion chamber with the descending flue, for the purpose of igniting the gases and retarding their progressive motion towards the bottom of the gas chamber.

HORACE BOARDMAN.

No. 191.—*Improvement in Carriages.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of two bars, or reaches, placed in connexion with the straight reach, as above described, and in combination with the spring rod and cross bar, substantially in the manner described.

JOHN JONES.

No. 192.—*Improvement in Cutting Stone.*

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as above described, of dressing, facing, or reducing stone, and other like materials, by means of a rolling edge or edges, acting against the face or surface of the material to be worked, substantially as herein described.

CHARLES WILSON.

No. 193.—*Improvement in Fire Arms.*

What I claim as my invention is—

First. The combination of the two independently adjustable braces, extending one on each side of the breech chamber containing the charge that is being fired, to regulate and accurately determine the joint between the breech and barrel, substantially as described.

Secondly. I claim the breech opening and closing on an axis which is parallel to the main barrel, and secured and regulated by the parts, substantially as described.

WM. W. HUBBELL.

No. 194.—*Improvement in Evaporators and Condensers.*

What I claim as my invention, and desire to secure by letters patent, is the partition (*n*) within the tank, for the purpose of dividing the water of the evaporator from that of the condenser, in the manner and for the purposes substantially as herein set forth.

EDWARD LYNCH.

No. 195.—*Composition for covering Hams.*

I do not intend to claim as my invention the covering of meats, or other articles, with paper and cloth, or other flexible material, previous to coating them with my preserving composition; but what I do claim as my invention, and desire to secure by letters patent, is the formation of a preserving composition for coating meats, cheeses, fruits, vegetables, &c., by the union of rosin, shellac, (or seed lack,) and linseed oil, (or other oil of a similar nature,) substantially in the manner and in nearly the proportions as herein set forth.

HORACE BILLINGS.

No. 196.—*Improvement in Washing Machines for cleaning Rags.*

What I claim as my invention, and desire to secure by letters patent, is an adjustable rotating water elevator and strainer, arranged substan-

tially as herein set forth, in such manner that it can be raised or lowered in the vat of the washing or beating engine, to vary the quantity of water discharged therefrom, or can be raised entirely from the vat, to stop the discharge of water, or for other purposes, as herein set forth.

I also claim a rotating prismatic screen, or strainer, for straining the water from the paper stock in the vat of a washing or beating engine, in combination with devices for discharging the strained water, the prismatic screen being not only more efficient than a cylindrical screen, but also admitting of more ready repair.

JAMES PHELPS.

No. 197.—*Improvement in Machinery for doubling, twisting, and reeling Thread.*

What I claim as my invention, and desire to secure by letters patent, is the above-described combination of doubling, twisting, and reeling mechanism, or elements, constructed, applied, and operating together, substantially as herein described, whereby I am able to double, twist, and reel each thread by the same machine, substantially in the manner as hereinbefore specified.

FRANK CHENEY.

No. 198.—*Improvement in the Machinery for manufacturing Felt Cloths without spinning and weaving.*

What is claimed as the invention of the said Thomas Robinson Williams is the method, substantially as described, of forming the bat by the combined use of two endless aprons, which receive the sliver from the doffer or a carding engine or otherwise between them, and from the bat on one of the belts, whilst the other acts as a support, substantially as described.

J. BURROWS HYDE.

No. 199.—*Improvement in the Machinery for manufacturing Felt Cloths without spinning and weaving.*

What is claimed as the invention of the said Thomas Robinson Williams is the method, substantially as described, of hardening the bat by passing the same between two series or tiers of rollers, covered with cloth or otherwise, and arranged over each other, the one series being provided with a reciprocating endwise motion, for the purpose of felting the bat, and the other series with a progressive rotary motion, for the purpose of feeding the bat through, with or without the use of a trough containing hot water and soap suds, or other matter, substantially as described.

J. BURROWS HYDE.

No. 200.—*Improvement in Cut-off, and working the Valves of Steam Engines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The method, substantially as described, of operating the slide valves of steam engines by connecting the valves that govern the ports

at opposite ends of the cylinder with separate arms of the rock shaft, or the mechanical equivalents thereof, so that, from the motion thereof, the valve that keeps its port or ports closed shall move over a less space, while its port or ports is closed, than the one that is opening or closing its ports, and *vice versa*; while at the same time the two arms by which they are operated have the same range of motion as described, whereby I am enabled to save much of the power heretofore required to work the slide valves of steam engines, and by which also I am enabled to give a greater range of motion to the valves at the periods of opening and closing the ports, to facilitate the induction and eduction of steam, as specified.

And, lastly. I claim the method of regulating the motion of steam engines by means of the regulator, by combining the said regulator with the catches that liberate the steam valves by means of movable cams or stops, substantially as described.

GEORGE H. CORLISS.

No. 201.—*Improvement in Door Locks.*

What I claim as my invention, and for which I desire to secure an exclusive right by letters patent, is making the cases in which the movements of locks and latches for doors are contained double-faced, or so finished that either side may be used for the outside, in order that the same lock or cased fastening may answer for a right or left-hand door, substantially as described.

I also claim the peculiar construction and double action (upon an inclined and horizontal track, or way) of the locking car, B, as hereinbefore described, and the combination of the locking car, B, and safety cars, G, G², with one another, and with the connecting or vibrating bar and bolt, A, as within described, so as to fasten the bolt, c, securely, and prevent its being picked.

CALVIN ADAMS. •

No. 202.—*Improvement in the Jacquard Machinery for weaving all kinds of Figured Cloth.*

Having thus described my improvements in looms, and pointed out their application to looms for weaving carpets and other figured fabrics, what I claim therein as new, and desire to secure by letters patent, is—

First. In connexion with looms for weaving figured fabrics, depressing the suspension-board, or its equivalent, while the corresponding pattern card, acting as a trap-board, or its equivalent, is elevated, substantially as described.

Second. I claim working the card prism by mechanism connected with the loom, and whilst the boards, or their equivalents, for working the harness, are not opening and closing the shed, substantially as described.

ALEXANDER CALDERHEAD.

No. 203.—*Method of attaching Augers to their Handles.*

What I claim as new in my invention, and desire to secure by letters patent, is the handle made in two parts, one of which, D, fits in a socket,

B, on the other, A, and carries a bolt, *f*, screwed at its end, the said bolt passing through a hole in the auger-shank, and screwing into a female screw, or nut, *a*, in the part A, for the purpose of clasping or firmly holding the auger-shank between the ends of the parts, A and D, of the handle or stock, substantially in the manner herein described.

JOHN E. LARKIN.

No. 204.—*Improvement in fastening of Scythes to the Snath.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The mode of attaching and securing the blade of the scythe to the snath, substantially as herein specified, to wit: by clamping its shank between the edge, *x*, of an aperture, *a*, in the end of a metal cap secured to the snath and two bearings or points, *g* and *f*, on the opposite side of the shank, and on opposite sides of the first-named bearing point, one, *f*, of the two bearings consisting in a screw, or its equivalent, for the purpose of giving the necessary pressure to clamp it.

Second. The method, substantially as herein described, of setting the edge of the blade more up or down by means of the adjusting screw, *g*, in combination with the edge, *x*, of the aperture, *a*, which forms one of the three bearing points of the shank.

C. S. CLAPP.

No. 205.—*Improvement in Steam and Vacuum Gauges.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The combining with the reservoir of mercury at the lower end of the tube, an elevated chamber, forming part of the reservoir, substantially as herein described, so that the zero-point may be high enough to be visible above the reservoir, as herein described, and also that the air contained in the tube, being condensed by the pressure of the mercury in the elevated chamber, may furnish more desirable divisions on the scale when very high pressures are to be indicated.

Second. The producing a partial vacuum in the tube of the steam gauge at the time of filling it with mercury, for the purpose of bringing the zero-point high enough to be visible above the reservoir, and also in order to prevent any partial vacuum produced in the boiler from draining all the mercury out of the tube.

Third. Surrounding the lower end of the glass tube with a metallic cylinder, provided with a cap or plug at its lower end, for protecting the glass tube, and allowing the mercury only to pass slowly either through a very small hole or between the threads of the screw, and the establishing a connexion between the reservoir and the boiler, substantially in the manner and for the purpose above specified.

Fourth. The method of preventing the air or moisture from passing between the mercury and the cylinder (*d*) into the tube, either by turning the cylinder or washing it with mercury, or by plunging it deeply into the mercury, as above described.

Fifth. Preventing the inside of the tube from being soiled with oxidised mercury, by either placing on the surface of the mercury in the tube some fluid (such as naphtha) which does not act perceptibly upon mercury, or by filling the tube with gas, as herein made known.

PAUL STILLMAN.

No. 206.—*Improvement in Reaping Machines.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is—

Firstly. The crooked arm or coupling piece, in connexion and combination with the rack piece, and the attaching and securing the crooked arm (supporting and sustaining the rack piece to the frame) at or about the centre, so as to produce a balance by securing it at such a point on either side or the centre of the driving wheel as shall secure the balance and give firmness to the rack piece.

Secondly. I claim the endless chain cutter, in combination with the pulleys and rack teeth, for cutting grain and grass, as above set forth.

W. F. KETCHUM.

No. 207.—*Improvement in Screw Wrench.*

I do not claim adapting one jaw to slide on a bar permanently attached to the other jaw, and constituting a handle, or permanently attached to a handle, as this was known prior to my invention, in wrenches having a pall and rachet to fix the sliding jaw in any position required; nor do I claim adjusting the sliding jaw relatively to the fixed jaw by means of a screw; this, also, having been known prior to my invention, with the screw connexion made between the two jaws, and also between the handle and outer jaw—in such cases the connexion between the bar and handle being weak and liable to derangement, and practically defective. But what I claim as my invention, and desire to secure by letters patent, is combining with a wrench in which the inner jaw slides on a bar permanently attached to the outer jaw, and making part of, or permanently attached to, the handle, substantially as described, a screw thread and nut, connecting the movable jaw with the said bar between the said movable jaw and that part of the handle grasped by the operator, in the manner and for the purpose substantially as described.

I also claim the arrangement of the screw upon the two circular edges of the flat bar, in the manner and for the purpose herein described.

SOLYMAN MERRICK.

No. 208.—*Improvement in the manifold permutation Lock for Doors, Vaults, &c.*

What I claim as new, and of my own invention, is—

First. The application of slides, or their equivalents, in combination with tumblers, each so constructed that the slides shall be set through the tumblers by a key or any arrangement of the key-bit sections, or the equivalents of the same, and then retained as set by any competent means, so that on the tumblers resuming their quiescent positions, they abut against the slides, and prevent the retraction of the bolt, substantially

as described and shown, but independent and irrespective of the means used to secure the slide in place.

Second. I claim the manner of fitting the slides with the cramp and nut, so as to retain the slides in the position they have been placed in by the key-bits and tumblers, as described and shown.

Third. I claim constructing the barrel of the key-bit in such a manner that it may be inverted with reference to the handle or shank, substantially in the manner and for the purposes herein described.

ROBERT NEWELL.

ADDITIONAL IMPROVEMENTS.

No. 97.—*Improvement in Churns.*

What I claim as my invention, and desire to secure by letters patent, is any desirable number of holes bored lengthwise through the partition, with the scallops at the bottom, all being constructed in the solid partition, substantially as herein described.

JOHN O'NEIL.

No. 98.—*Improvement in preparation of Dye-Stuff from Spent Madder.*

What I claim as my improvement upon my said patent, and desire to secure by annexing this description to said original specification, as dispensing with the washing of the spent madder in the first place, and the drying and pulverizing it after it has passed through the other processes, and substituting drawing or pressing instead.

FREDERICK PFANNER.

No. 99.—*Improvement in Bedsteads.*

What I claim as my invention, and desire to secure by additional letters patent, is the mode of jointing the head and foot rails, and of reversing the arm of the winch, as hereinbefore described.

HENRY PACE, SEN.

DESIGNS.

No. 341.—*Design for a Cook Stove.*

What I claim herein as new, and for which I desire letters patent, is the ornamental design for a stove substantially as represented in the accompanying drawings.

W. C. DAVIS.

No. 342.—*Design for Stove.*

What we claim as our invention or production, and desire to secure by letters patent, is the ornamental design as above described and represented in the accompanying drawings.

CHARLES GILBERT,
W. G. HALLMAN.

No. 343.—*Design for Stoves.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms, represented in the accompanying drawings, forming together an ornamental design for a parlor stove.

ELIHU SMITH.

No. 344.—*Design for Stoves.*

What I claim as new, and my invention, is the arrangement and combination of the above-described and represented shapes, figures, ornaments, flutes, and mouldings into the above-specified design, for coal-heating stoves, substantially as above shown.

JOSEPH G. LAMB.

No. 345.—*Design for Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental design for a stove as herein described and represented in the annexed drawings.

S. W. GIBBS.

No. 346.—*Design for Cooking Stoves.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the annexed drawings, as making an ornamental design for a cooking stove.

S. W. GIBBS.

No. 347.—*Design for Stoves.*

What we claim as our invention, and desire to secure by letters patent, is the combination and arrangement of the above-represented scrolls, foliage, figures, and mouldings into an ornamental design for coal and wood parlor stoves, to be known and called Harris & Zoiner's patent coal and wood parlor stove.

CONRAD HARRIS,
PAUL W. ZOINER.No. 348.—*Design for Cooking Stoves.*

What I claim as new, and desire to secure by letters patent, is the design of cook stove substantially the same as herein described and represented.

SAMUEL A. HOUSE.

No. 349.—*Design for Parlor Stoves.*

What I claim as new, and desire to secure by letters patent, is the design of stove plate substantially the same as herein described and represented.

SAMUEL A. HOUSE.

No. 350.—*Design for Umbrella Stands.*

What your petitioner claims as new, and desires to secure by letters patent, is the peculiar ornamental design or figure as shown in the accompanying drawing.

EDWARD J. DELANY.

No. 351.—*Design for Cooking Stoves.*

What I claim as my invention, and wish to secure by letters patent, the application of the above design to cooking stoves.

S. H. SAILOR.

No. 352.—*Design for Furnace Registers.*

Having thus described my new design, I shall state my claim as follows: What I claim as my production, and desire to have secured to me by letters patent, is the new design, hereinabove described, for a register, in the form of a circle, having within and near to its outer ring, two concentric rings, the space between each of said rings being ornamented with curved lattice work, forming hyperbola-shaped openings, and a ring in its centre, enclosing an eight leaved star, with a small circle in its centre, and curved and notched branches, radiating from the said ring to the smaller of the outer rings, forming irregular and heart-shaped openings, all as hereinabove described and shown in the win g.

GARDNER CHILSON.

No. 353.—*Design for Furnace Registers.*

Having thus described my new design, I shall state my claim as follows:

What I claim as my invention or production, and desire to have secured to me by letters patent, is the new design, hereinabove described, for a register for furnaces, &c., of rectangular form, having within it a smaller rectangle, connected to the edge of the register by curved bars, of the shape shown in the drawing, said inner rectangle having a square in each corner, and small rectangles within its sides, said squares being ornamented with curved bars, forming the lattice-work, *h, h, i, i, &c.*, and said smaller rectangles being ornamented with semi-circular and diamond-shaped lattice work, and a rectangle in the centre of the register, ornamented with irregular curved branches or bars, proceeding from its sides to a ring enclosing a four-notched leaved star, the whole forming a lattice or open work for the heat to pass through, all as hereinabove described.

GARDNER CHILSON.

No. 354.—*Design for Furnace Registers.*

Having thus described my new design, I shall state my claim as follows:

What I claim as my production, and desire to have secured to me by letters patent, is the new design, hereinabove described, for a register of

rectangular form, having within its sides two smaller rectangles, one within the other, the space between the outer bars of the register and the larger rectangle being ornamented with curved lattice-work; and the triangular openings, *e, e*, and the space between the two inner rectangles, being ornamented with irregular heart and diamond-shaped openings, while the centre of the register is occupied by a five oval-leaved star, in a ring, with curved and notched branches or bars running from said ring to the inner rectangle, all as hereinabove described and represented in the drawing.

GARDNER CHILSON.

No. 355.—*Design for Registers for Furnaces.*

Having thus described my new design, I will state my claim as follows:

What I claim as my invention or production, and desire to have secured to me by letters patent, is the new design, hereinabove described, for a register of rectangular form, having within its sides a smaller rectangle, the space between the two being ornamented with the circular and diamond-shaped lattice-work shown in the drawing, the inner rectangle being ornamented with irregular curved bars or branches, running from its sides to a ring in its centre, which encloses a five-pointed star, with curved sides, the whole forming a lattice work for the passage of the heat, all as hereinabove described.

GARDNER CHILSON.

No. 356.—*Design for Stoves.*

What I claim, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the annexed drawings, as making an ornamental design for a six-plate stove

S. W. GIBBS.

No. 357.—*Design for Stoves.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawings, forming together an ornamental design for the side of a cooking stove, and the back and front plates of the elevated oven.

S. W. GIBBS.

No. 358.—*Design for Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the combination and arrangement of ornamental forms and figures represented in the accompanying drawings, and forming a design for an ornamented cooking stove.

JOHN S. PERRY.

No. 359.—*Design for Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the combination and arrangement of ornamental figures shown in the

accompanying drawings, forming a new ornamental design for an air-tight box stove.

SAMUEL W. GIBBS.

No. 360.—*Design for Pedestals and Columns.*

We do not mean to limit ourselves to the material out of which this is to be formed, but we prefer a casting of iron; neither do we mean to limit ourselves to the exact size or proportions, the ornamental portions remaining substantially as described and shown. What we claim as new, and of our own invention, is the design and configuration shown in fig. 1, as attached to or formed on the pedestal in alto relievo, as described and shown; and we also claim the design shown in fig. 2, as forming the base of the column attached, as described and shown.

WILLIAM LEWIS,
W. H. LEWIS.

No. 361.—*Design for Parlor Grates.*

Having thus described my new design, I shall state my claim as follows: What I claim as my production, and desire to have secured to me by letters patent, is the several ornamented mouldings round the hearth-plate, ash pan, and front and top plates, above described and represented in the drawings, with the ornaments above specified and shown in the several drawings, as cast on the front and top plate, and blower and top of the grate, forming a new design for a parlor grate.

JOSEPH PRATT.

No. 362.—*Design for Parlor Grate.*

What I claim is the new and ornamental design for the top plate, the front plate, the base plate, and the blower, as represented in the drawings.

WINSLOW AMES.

No. 363.—*Design for Air-Tight Stoves.*

What I claim as my invention is the ornamental design of the air-tight stove substantially as exhibited in the drawings, and as above described.

N. P. RICHARDSON.

No. 364.—*Design for Air-Tight Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the design for stoves substantially as herein set forth and represented in the accompanying drawings.

FRED'K SCHULTZ.

No. 365.—*Design for Stoves.*

I claim as my invention or production the ornamental design essentially as described and represented in the drawings.

SETH WILLIAMS, JR.

No. 366.—*Design for Stoves.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawings, forming together an ornamental design for a cooking stove.

S. W. GIBBS.

No. 367.—*Design for Cooking Stoves.*

Having thus described my new design, I shall state my claim as follows:

What I claim as my invention or production, and desire to have secured me by letters patent, is the design composed of the several ornamental mouldings and configuration hereinabove described and represented in the drawings, for the front, side, and back plates of a cooking stove.

DUTEE ARNOLD.

No. 368.—*Design for Cooking Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the design, configuration, and arrangement of the ornaments on the several parts of the cooking stove as herein represented and described.

JNO. ABENDROTH.

No. 369.—*Design for Bust of Jenny Lind.*

Having thus described my new design, I shall state my claim as follows:

What I claim is the design of a bust of Jenny Lind, of the cabinet size, as represented in the drawings above referred to.

THOMAS BALL.

No. 370.—*Design for Stove Doors and Panels.*

What I claim as my invention, and desire to secure by letters patent, is the general arrangement and configuration of the ornaments and mouldings, A, B, C, D, E, F, substantially as herein shown.

M. C. BURLEIGH.

No. 371.—*Design for Floor Oil Cloth.*

And what is claimed as my invention, and desired to be secured by letters patent of the United States, is the arrangement of ornamental figures forming a design for floor oil cloths, as shown in the aforesaid drawing.

JAMES HUTCHISON.

No. 372.—*Design for Clock Frame.*

What I claim as my production, and desire to secure by letters patent, is this combination of figures, placed in the manner described, so as to form the front of a clock frame or case.

NATH. A. BATCHELOR.

No. 373.—*Design for Stoves.*

Having thus fully described our improvement and design, what we claim therein as new, and for which we desire to secure letters patent, is the foregoing described form and configuration of the plates, forming an ornamental design for a stove, as represented and illustrated by the drawings.

JAMES WAGER,
DAVID PRATT,
VOLNEY RICHMOND.

No. 374.—*Design for Bedsteads.*

What I claim as my invention, and desire to secure by letters patent, is the designs and ornaments upon the parts, A, B, C, and D, combined as in the drawing hereto annexed.

P. M. HUTTON.

No. 375.—*Design for Stoves.*

Having thus described my new design, I shall state my claim as follows:

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the several ornamental configurations and mouldings hereinabove described and represented in the drawings, for the side and front plates of a cooking stove.

WM. L. HATHAWAY.

No. 376.—*Design for Stoves.*

Having thus described my new design, I shall state my claim as follows: What I claim as my production, and desire to have secured to me by letters patent, is the design, consisting of the several mouldings, leaf work, and scrolls, hereinabove described, and represented in the drawings for the front, side, and back plates of a cooking stove.

N. P. RICHARDSON.

No. 377.—*Design for Stoves.*

What I claim, and desire to secure by letters patent, is the design and configuration of ornamented stove plates substantially the same as described and represented.

EZRA RIPLEY.

No. 378.—*Design for Stove Plates.*

Having thus described my new design, I shall state my claim as follows: What I claim as my production, and desire to have secured to me by letters patent, is the design, consisting of the mouldings, panels, and gothic arches, hereinabove described, and represented in the drawings for the top and front plates of a parlor stove.

LYMAN S. HAPGOOD.

No. 379.—*Design for Stoves.*

What I claim as new, and desire to secure by letters patent, is the border, A, with its corner pieces, the figures, B, C, and D, the borders, E, E, E, E, and F, F; said borders and figures being of the form, situated precisely as represented and described.

WM. L. SANDERSON.

No. 380.—*Design for Stoves.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental forms and figures represented in the annexed drawings, forming the ornamental designs for front and side plates of a cooking stove, with the doors thereto belonging.

S. W. GIBBS.

No. 381.—*Design for Stoves.*

Having thus fully described my design, what I claim therein, and desire to have secured by letters patent, is the design or ornamental pattern herein fully set forth and delineated.

W. G. HALLMAN.

No. 382.—*Design for Stoves.*

Having thus fully described our ornamental designs, what we claim, and desire to secure by letters patent, is the ornamental designs (stove pattern) above described, formed of flat ribbons, as fully illustrated.

A. COX,
ELIAS JOHNSON,
D. B. COX.

No. 383.—*Design for Stoves.*

Having thus fully described our improved design, what we claim, and desire to secure by letters patent, is the within-described and illustrated ornamental design stove pattern.

A. COX,
ELIAS JOHNSON,
D. B. COX.

No. 384.—*Design for Stoves.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawings, forming together an ornamental design for a six-plate stove.

JNO. F. RATHBONE.

No. 385.—*Design for Stoves.*

We have thus detailed the particular ornamental designs on the respective plates which we wish to patent, and do hereby claim the exclusive right to the said ornamental designs for stove-plates, as we have laid them out and displayed them.

DAVID STUART,
JACOB BEESLEY.

No. 386.—*Design for Stoves.*

Having thus fully described and shown the aforesaid design, what I claim as my invention, and desire to secure by letters patent, is the combination and arrangement of the above-described and represented shapes, mouldings, and ornaments, substantially as herein shown.

JOSEPH G. LAMB.

No. 387.—*Design for Stoves.*

Having thus fully described the various parts of the above-named ornamental design, what I claim as new, and my invention, and desire to secure by letters patent, is the combination and arrangement of the herein-represented shapes, ornaments, mouldings, and figures, when combined and arranged substantially as shown.

JOSEPH G LAMB.

No. 388.—*Design for Stoves.*

What I claim as new, and desire to secure by letters patent, is the design and configuration of box stove, substantially the same as herein described and represented.

SAMUEL A. HOUSE.

No. 389.—*Design for Cooking Stoves.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawings, forming together the ornamental designs for the plates of a cooking stove.

JNO. F. RATHBONE.

No. 390.—*Design for Stoves.*

Having described and represented my ornamental design for stoves, I wish it to be understood that I do not claim the radiating ornaments or the mouldings, separately considered; but what I do claim is the combination of the ornaments as described and represented.

W. C. DAVIS.

No. 391.—*Design for Parlor Stoves.*

Having thus described my new design, I shall state my claim as follows:

What I claim as my production, and desire to have secured to me by letters patent, is the design, consisting of the ornamental configurations, flower and leaf work, hereinabove described and represented in the drawings respectively, for the top and bottom plates of a parlor stove.

JOSEPH PRATT.

No. 392.—*Design for Water Coolers.*

What I claim as my design, and desire to secure by letters patent, is, first, the form and general configuration of the outer casing, substantially as described and represented in the drawing; second, the dolphin spout, *l*; and, third, the configuration of the handle, *j*, *j*, *k*, of the cover, substantially as shown.

WILLIAM BURNET.

No. 393.—*Design for Stoves.*

What I claim as new, and desire to secure by letters patent, is the design and configuration of ornamental stove plates as herein described and represented in the annexed drawings.

JAMES V. DE WITT.

No. 394.—*Design for Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the ornaments and mouldings herein described as constituting a design for cooking stoves.

S. W. GIBBS.

No. 395.—*Design for Plates of Franklin Stoves.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawings, forming together the ornamental designs for the plates of a Franklin stove.

JOHN F. RATHBONE.

No. 396.—*Design for Cooking Stoves.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawings, forming together the ornamental designs for the plates of a cooking stove.

JOHN F. RATHBONE.

No. 397.—*Design for Stove Plates.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental design or production represented by figures 2 and 4, to be used with the carving represented by letters, O, P.

ELIJAH P. PENNIMAN.

No. 398.—*Design for Stove Plates.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental design or production represented by figures 1 and 3, to be used with the carving represented by letter N.

ELIJAH P. PENNIMAN.

No. 399.—*Design for Plate of Parlor Stoves.*

Having thus described my new design, I shall state my claim as follows: What I claim as my production, and desire to have secured to me by letters patent, is the design, consisting of the ornamental arches, panels, and mouldings, hereinabove described and represented in the drawings respectively, for the front and top plates of a parlor stove.

APOLLAS RICHMOND.

No. 400.—*Design for Cast Iron Tomb.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental design for a cast iron "cemetery tomb," ornamented as herein described.

HENRY R. FLINCHBAUGH.

No. 401.—*Design for Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental designs for ornaments upon cast iron stove plates, above described, and more fully shown in the annexed drawings.

R. J. BLANCHARD.

No. 402.—*Design for Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental design for cast iron stove plates shown in the annexed drawings, and above described.

R. J. BLANCHARD.

No. 403.—*Design for Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental design above described, and delineated in the annexed drawings, as an ornament for the plates of cast iron stoves.

R. J. BLANCHARD.

No. 404.—*Design for Stoves.*

What I claim, and desire to secure by letters patent, is the design and configuration of ornaments, as applied to stoves, substantially the same as described.

N. S. VEDDER.

No. 405.—*Design for Ladies' Combs.*

What I claim as new and original, and desire to secure by letters patent, is the design, A, placed on the top, or upper part, of the comb, formed or composed of the series of oblique rings, as herein represented and described.

AARON COOK

No. 406.—*Design for Stove Plates.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental design of a stove plate, substantially as herein described and represented.

CALVIN FULTON.

No. 407.—*Design for Cast Iron Bedstead.*

What I claim as my invention, and desire to secure by letters patent is the designs and ornaments upon the parts A, B, C, and D, combined as in the drawing hereunto annexed, as applied to iron bedsteads.

PELLATIAH M. HUTTON.

No. 408.—*Design for Stoves.*

I claim as my invention or production, and desire to secure by letters patent, the above-described and illustrated design for the several plates of a stove, as fully set forth—that is to say, I claim the design on each of the plates separately, and on all the plates in combination.

A. W. JONES.

No. 409.—*Design for Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental design for a stove as herein described and as represented in the annexed drawings.

S. H. SAILOR.

No 410.—*Design for Stoves.*

I disclaim the hearth, W, in fig. 1, and the projection, L, in fig. 2. But what I do claim as my design and production, and desire to secure by letters patent, is the basso relievo ornaments, form, and configuration of the doors, E, F, and G, in fig. 1, which are substantially the same as before described in the doors, figs. 2, 3, and 4.

SILAS MERCHANT.

No. 411.—*Design for Floor Oil Cloths.*

And what is claimed as my invention, and desired to be secured by letters patent of the United States, is the arrangement of figures forming a design for floor oil cloths, as shown in the aforesaid drawing.

JAMES HUTCHINSON.

No. 412.—*Design for Shovel Stands.*

What I claim as my invention, and desire to secure by letters patent, is the design and configuration of the stand as a whole, as fully shown and represented in the drawing at figure I.

I claim, also, the particular ornamenting of the shell or dish used as a base, and the configuration and ornamenting of the standard or upright, and the design of the hooks and the handle, as fully shown and represented in the drawings at figures I, II, III, and hereinbefore fully forth.

CHARLES ZEUNER.

No. 413.—*Design for Metallic Gates.*

I do not claim the design for the posts or pillars in this gateway, but only the form of the gate suspended between the posts; and I claim the design for gates of this pattern, of whatever size they may be made, and of whatever metal they may be cast, and for whatever purposes they may be used.

EBE'R WEEMAN.

No. 414.—*Design for a Ventilating Stove or Furnace.*

What I claim as my production, and desire to secure by letters patent, is the design marked figure 1 and figure 2.

ELIJAH P. PENNIMAN.

No. 415.—*Design for Tables.*

What I claim as my invention, and desire to secure by letters patent, is the design and configuration of table pillars in the form of vines, supporting, by their branches, the drawer and upper part of the table with flaring scroll, balustrade pillars, supporting a rim which encircles the main pillars, together with the configuration of an ornamental, open-work drawer and Capital exposed to view on all sides; the whole combining various styles of architecture, as hereinbefore described.

NATHAN CHAPIN.

No. 416.—*Design for Stove Fronts.*

What I claim, and desire to secure by letters patent, is the design and configuration of parlor stove fronts substantially the same as described and represented.

EZRA RIPLEY.

No. 417.—*Design for Stoves.*

Having thus distinctly represented and described the nature and arrangement of the respective ornaments and figures upon the front and hearth plates of my Franklin stove, what I claim therein as new, and desire to secure by letters patent, is the design, configuration, and arrangement of the said ornaments as herein designated and represented.

LYMAN COBB.

No. 418.—*Design for Stoves.*

What I claim as my invention, and wish to secure by letters patent, is the ornamental design and general configuration of the parts of my stove as herein designated and represented.

CHARLES J. WOOLSON.

No. 419.—*Design for Cast Iron Fences.*

What I claim, and desire to secure by letters patent, is the design and configuration of ornamental iron fence railing, substantially the same as described and represented in the annexed drawing.

JOHN T. DAVY.

No. 420.—*Design for Stoves.*

What I claim as original, and wish to secure by letters patent, is the design and configuration of the several ornamental figures on the front and side plates and doors of a certain stove, as represented in the annexed drawings and as above described.

WILLIAM SAVERY.

No. 421.—*Design for Stoves.*

What I claim as new, and desire to secure by letters patent, is the design of ornament and configuration of cook stove substantially the same as herein described and represented.

EZRA RIPLEY.

No. 422.—*Design for Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental design for a stove as herein described and as represented in the annexed drawings.

S. W. GIBBS.

No. 423.—*Design for Iron Railings.*

What I claim as my invention, and desire to secure by letters patent, is the design, arrangement, and configuration of the several ornaments composing the balustrade and step-railing branching or leading therefrom, as represented and described.

FREDERICK FITZGERALD.

No. 424.—*Design for Parlor Stove Plates.*

Having thus described my new design, I shall state my claim as follows: What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the mouldings, panels, and ornamental configurations hereinabove described and represented in the drawings, respectively, for the top, front, and end plates of a parlor stove.

APOLLOS RICHMOND.

No. 425.—*Design for a Hat Stand.*

What I claim as my invention is the design and configuration of a hat stand, representing a Triton, or similar figure, holding up the branches of a plant, in the manner aforesaid, with the basin lying in a bed of leaves or flowers, all arranged substantially as above described and set forth.

C. MULLER.

No. 426 — *Design for a Parlor Stove.*

What we claim, and desire to secure by letters patent, is the design and configuration of a parlor stove substantially the same as herein described and represented in the annexed drawing.

EZRA RIPLEY,
N. S. VEDDER.No. 427.—*Design for Stove Registers.*

What we claim as our invention, and desire to secure by letters patent, is the ornamental design for a register as herein described and represented in the annexed drawings.

DAVID STUART,
JACOB BEESLEY.No. 428.—*Design for Stoves.*

What I claim, and desire to secure by letters patent, is the ornamental design and configuration of cook stove substantially the same as described and represented in the annexed drawing.

J. D. GREEN.

No. 429.—*Design for Stoves.*

The said design consists of the ornamental semi-star and rays and mouldings of the end or side of the top plate, (as seen in the drawings,) the circular ornament, A, and four or more surrounding ornaments, B, C, D, E, together with the mouldings of the top and bottom plate, all essentially as represented in either of the side or end views, and their sections, and such ornamental design, substantially as exhibited in the above-mentioned drawings, I claim as my invention or production; and I also claim the ornamental design or configuration of the water urn, as shown in figures 1, 2, and 3.

WINSLOW AMES.

No. 430.—*Design for Frames for Presses, Mantel Pieces, &c.*

What I claim as new, and desire to secure by letters patent, is the design of the frame for presses, mantel-pieces, &c., above described.

EDMUND L. FREEMAN.

DISCLAIMERS ENTERED DURING THE YEAR 1851.

Crackers—Cutting.

Your petitioner, therefore, hereby enters his disclaimer to that part of the claim in the said last-named specification which is in the following words, to wit:

"What I claim as my invention, and desire to secure by letters patent, is cutting, by means of reciprocating cutters, on an apron having an intermittent motion, substantially as described, by combining and connecting together, in the manner substantially as herein described, the reciprocating motion of the cutters with the intermitting progressive motion of the apron that carries the dough to and under the cutters, to be delivered as described, whereby the apron moves the dough forward the required distance while the cutters are up, and remains at rest while they are cutting and leaving the dough."

Your petitioner further represents, that at the expiration of the said letters patent he was the owner of all the rights thereunder for making the machines therein described throughout the United States, but that he had sold several of such machines, together with the right to use the same, to different persons in various parts of the United States; and this disclaimer is to operate to the extent of the interest in said letters patent vested in your petitioner at the time of the expiration thereof, your petitioner having paid \$10 into the treasury of the United States, agreeably to the requirements of the acts of Congress in that case made and provided.

WILLIAM R. NEVINS.

Heddles—Wire Machinery for making.

The subscriber further represents that he is the sole and exclusive owner of the said letters patent, and of the right, interest, and property therein and thereby secured; and although he did not intend, in or by the specifications and drawings upon and in reference to which said letters patent were issued, (and of which copies are annexed to and form a part of said letters patent,) to represent or claim that he was the original or first inventor of the wheel, collar, or flange, with a sliding tooth and pulley, and treadle, or other device hereinafter particularly mentioned, or of any part thereof; and he insists that said specifications and drawings do not, when rightly understood, represent or claim that he was such inventor; and he also insists that said letters patent do not, when rightly understood, assume to confer on him any right as the supposed, assumed, or alleged inventor thereof, or of any part thereof; yet, in order to guard against any mistake or misconstruction in these respects, the subscriber states:

(1.) That he did not mean to assert, claim, or represent, in and by said specifications or drawings, that he was the original or first inventor of the wheel mentioned as wheel fig. 8, in said specifications and drawings.

(2.) Nor did he mean to assert, claim, or represent, in and by said specifications or drawings, that he was the inventor of the collar or flange,

with a sliding tooth, which are partially represented on the drawing, fig. 1, near letter Q, and also partially represented on the drawing, fig. 2, at that end of the cylinder where the receiving and discharging hook rod shows the hook, and near letter B.

(3.) Nor did he mean to assert, claim, or represent, in and by said specifications or drawings, that he was the inventor of the cord, pulley, or treadle partially represented on the drawing, figure 1, which cord, as there shown, extends from said pulley, near letter C, to said treadle.

(4.) Nor did he design, or intend by said specifications or drawings to claim, assert, or represent, that his invention would make a heddle, with a slack twist, in the half or part thereof which is towards the end where the wire is doubled.

And the subscriber says, that if said specifications and drawings import or mean that any or either of the aforesaid things was, or were, invented by him, or that his invention, as claimed by him, would make a heddle with any such slack twist, as aforesaid, the same was, and were, by and through inadvertence, accident, and mistake, not being so designed or intended by him; and he hereby fully disclaims the several matters and things aforesaid, numbered above, (1,) (2,) (3,) (4,) each and every part thereof, under and pursuant to the seventh section of the act of Congress entitled "An act in addition to the act to promote the progress of science and useful arts," approved March 3, 1837, and under and pursuant to the law in such cases made and provided; insisting, however, as he does, that the same are not, nor is any part thereof, claimed in and by said specifications and drawings, or either of them, or embraced in said letters patent; this disclaimer being made for greater caution, and to guard against misconstruction and mistakes in regard to such matters.

A. J. WILLIAMS.

Hide-handling Cylinders—Beaters in.

Your petitioner, therefore, hereby enters his disclaimer to that part of the claim in the aforesaid specification which is in the following words, to wit: "Second. The *rollers* or *slats*, in combination with the chamber;" which disclaimer is to operate to the extent of the interest in said letters patent vested in your petitioner, he having paid ten dollars into the treasury of the United States, agreeably to the act of Congress in that case made and provided.

JAMES R. INNIS.

EXTENSIONS.

Improvement in the Machine for moulding and pressing Bricks.

I claim as my invention the combination of the parts of said machine in the manner above described, or in any other manner substantially the same, for the purposes aforesaid, but no one part separately or independently of this combination.

NATHANIEL ADAMS.

Improvement in the mode of supporting the Bodies of Railroad Cars and Carriages.

What I claim as my invention is the application of the vibrating cylinder plates, as set forth in the specification, whereby to support all kinds of eight-wheeled railroad carriage bodies upon springs, or in any other form or size whereby the same principle is used to obtain the same object.

RICHARD IMLAY.

Improvement in the Horse Rake.

What I claim as my improvement in the above-described machine, not before used or known before my application, is the iron, steel, or other elastic rods or teeth, as above specified.

DAVID DEWEY.

Improvement in the Loom for Weaving Knotted Counterpanes and other Fabrics in which the woof is raised from the surface.

Separately and singly, I claim as my inventions and improvements as follows:

First. Raising the knots which compose the figure from the surface of the cloth by a series of movable dents, or teeth, or hooks.

Second. Supporting the woof during the operation of the movable dents, or teeth, or hooks, and thereby regulating the length of the knots, by a bar, beam, or race piece, as hereinabove described.

Third. Separating or dividing asunder the threads of the warp by means of bevelled pieces of metal on the sides of the movable dents, or hooks, or teeth, to prevent them from catching into and breaking the threads.

Fourth. A toothed cylinder, or cylinders, acting on the machinery intervening between them and the dents, or teeth, or hooks, and operating the dents, or teeth, or hooks, successively, to raise the knots which compose the figure.

Fifth. The application of a prism and pattern card, to regulate the operation of the hooks, or teeth, or dents, to produce the variations in the pattern or figure.

ERASTUS B. BIGELOW.

Improvement in the Figure Power Loom.

What I claim as my invention, and wish to secure by letters patent, is the entire manner of constructing and combining the apparatus for working the jacks, as herein described, consisting essentially of the lifting and depressing rods; the rods with rollers, for throwing out the jacks, arranged upon a cylinder, or otherwise; the lifting rods and the upper shaft, with its connexion by gearing with the roller cylinder. I also claim the two notched wheels upon the upper shaft, as constructed, combined, and used for working the pick.

WILLIAM CROMPTON.

Improvement in the Rotary Press for pressing Woollen and Cotton Goods.

What I claim as my invention in the within-described apparatus for pressing cloth, is the using of a metallic box, so formed as that a pressing roller may be made to revolve within a concave extending along it, and into which box steam, or other heated material, may be admitted when required; the whole constructed for the pressing of the cloth, either hot or cold, substantially in the manner herein set forth.

MOSES BAYLEY.

Improvement in the Plough.

What I claim in reference to the share is the making it with plain surfaces instead of curved ones, in the manner described, continuing such surfaces to the shoulder on each side, so as to leave the metal throughout so thin, that when it wears off by use, the share will still present a thin edge to the ground. I claim, also, the reversing cutter, received into a recess on the land side, and capable of having either of its edges presented forward, so as to form the cutting edge of the plough, and secured in its place on the land side by a wedge, or wedges, or in any other manner which may be preferred.

I likewise claim the mode of forming the renewable points, as herein specially set forth.

BANCROFT WOODCOCK.

Improvement in the Machine for spinning Woollen Roving.

What I claim as my invention is this: the application of this endless belt, so as to twist the thread of the woollen roving on its passage from the back rollers to the front rollers, as before described.

EDGAR M. TITCOMB.

Improvement in the Machine for Threshing and Cleaning Grain.

We claim as our invention the construction and use of an endless apron, divided into troughs or cells, in a machine for cleaning grain, operating substantially in the way described. We claim, also, the revolving rake for shaking out the straw, and the roller for throwing it off the machine, in combination with such a revolving apron as set forth. We claim the guard slots, E, in combination with a belt, constructed substantially as above described, and the combination of the additional sieve and shoe with the elevator, for carrying up the light grain, in the manner and for the purpose herein set forth.

JOHN A. PITTS,
HIRAM A. PITTS.

VIII.

PAPERS AND ABSTRACTS

RELATING TO

EARLY AMERICAN INVENTIONS.

FROM THE ARCHIVES OF THE STATES.

No returns have been received under this head during the past year. This is to be regretted, as there is reason to believe much interesting matter still remains unexplored in State and municipal documents, and in the collections of societies and of individuals. With the view of reminding statesmen, historical and archæological societies, and citizens at large, of the importance of embodying the desired information in the Reports of this Office, for the use of future historians of the arts, their attention is again invited to the Circulars issued on the subject, the one marked [A] to Governors of States and Territories, and [B] to members of Congress.

[A.]

UNITED STATES PATENT OFFICE.

SIR: Endeavoring to trace up the history of American inventions as a duty appertaining to this Bureau, and supposing that interesting facts may lie hidden in the archives of the various States, particularly in the records of patents, of which some are known to have been granted under colonial rule, and others by more or less of the States, previous to their conceding the right to the general government, I respectfully request to be furnished with copies of any such documents as may be on file in the State Department of your State, the expense of which will be cheerfully borne by this Office.

It is well known that the application of machinery to many branches of art was begun, and has been brought to its present degree of perfection, almost solely by the ingenuity and labors of our countrymen. I need hardly instance the working of lumber, improvements in ploughs, the cut nail and card-making mechanism; yet definite information respecting these and other inventions, while in their infancy, is entirely wanting.

It is necessary that this Office should possess information on these points, the law clearly requiring, though not in express terms, that descriptions of all known inventions should be within reach, that patents may not be granted for things previously secured. Irrespective of the light they will reflect on the origin of inventions to which they relate, and early struggles of inventors, an increasing interest will be attached to them as matters of enlightened curiosity.

Information respecting the forms of patents, length of time for which they were granted, fees paid, &c., will be highly acceptable, as also anything relating to the early progress of the arts in your State.

In case no official documents of the kind are on file, may I beg the favor of your referring the subject to any literary or scientific society, or to private individuals who may be in possession of the information sought.

With sentiments of high regard, I have the honor to be your obedient servant,

THOMAS EWBANK, *Commissioner*.

His Excellency ———, *Governor of* ———.

[NOTE.—It is not known that patents were issued for inventions in Louisiana by the French, or in Florida, Texas, and New Mexico by the Spaniards; but if any were granted, copies of them would be of unusual interest.]

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[B.]

UNITED STATES PATENT OFFICE.

SIR: A copy of the accompanying Circular has been addressed to each of the governors of the States and Territories of the Union, and I respectfully solicit your co-operation in furthering the objects sought to be accomplished. Whatever assistance or advice your more important engagements may permit you to give, will be highly appreciated.

There are, it is believed, among your constituents, descendants of old inventors and patentees, who, having documents of the kind referred to in their possession, would be glad to have them filed in this Office, and noticed in its Reports, as an act of justice to the ingenuity and memories of their ancestors.

I have the honor to be, with sentiments of high regard, your obedient servant,

THOMAS EWBANK.

Hon. ———.

IX.

COMMUNICATIONS.

1. ON CHINESE HOROLOGY, WITH SUGGESTIONS ON THE FORM OF CLOCKS ADAPTED FOR THE CHINESE MARKET.
2. ON THE TALLOW-TREE OF CHINA. [See the Agricultural portion of the Report.]

NINGPO, August 29, 1851.

MY DEAR SIR: As the object of the accompanying papers is of a public character, and as they were drawn up in accordance, it is believed, with the wishes of the Department over which you preside, I trust I shall not be considered trespassing in forwarding them overland, particularly as I can avail myself of no other safe channel. I have already forwarded, via the Cape, per ship, sundry seeds, eggs of the silk-worm, with specimens of vegetable tallow and insect wax, which will be anticipated doubtless in their arrival by this. The paper on the Tallow-tree may be useful to southern agriculturists, as the same, or a kindred species, is common in that section of our country. I hope, also, that I have not taken too much liberty in sending a duplicate of my paper on Clocks, under cover to your Department, for Silliman's Journal.

I cannot conclude this note without expressing my personal regard for you as a townsman and acquaintance. I knew you well in my boyhood as one of the fathers and patrons of the New York Mechanics' Institute, with which I was early connected; again I became acquainted with you as an author, (but, alas! I have not your work in my library;) and now, in my voluntary exile, I meet you as it were, after the lapse of many years, as the director of an important institution of my native land. Will you not suffer the acquaintance to be continued so far as to favor me with copies of all public documents of scientific interest which you may have at your disposal.

Be so good as to let me know if I can serve you in any way in China, and believe me, my dear sir, yours, most faithfully,

D. J. MACGOWAN.

THOS. EW BANK, Esq.,
Commissioner of Patents.

On Chinese Horology, with suggestions on the form of Clocks adapted for the Chinese market.—Written for the Patent Office Report, by D. J. Macgowan, M. D., of Ningpo, China.

A request made about two years since by the United States Patent Office, for information from American citizens resident in China, calcu-

lated to be useful to home industry, has not received that attention which it merits, notwithstanding there exist as incentives, on the one hand, the unrenounceable claim of country, and, on the other, the ample opportunities for complying with that request. Her wide-spread territory, the varied productions of her soil, and the high position of China as an agricultural State, lead us to expect that no inconsiderable addition to our own agriculture would result from a careful survey of the various points accessible to foreigners; and it would doubtless be found that many plants, indigenous to this soil, are capable of being naturalized in one part or another of our continent.

In a manufacturing point of view, although there is much less to repay research, yet there are some branches of industry in this department the investigation of which could not fail to bring valuable facts to light; and, if no more can be done than to point out defects in Chinese labor, which our artisans can supply, that alone would prove mutually advantageous to the two great nations on the opposite shores of the Pacific.

Clock-making, which forms the subject of this note, is a case in point; and it is believed that, with a modification to be suggested, American clocks can be made an article of extensive import into China. For a long period the importation of clocks and watches, chiefly the former, into this country from the continent of Europe, was little short of half a million of dollars annually. This trade has nearly ceased, partly owing, no doubt, to the rapid impoverishment of the country by the opium traffic, and partly to the fact that native manufacturers are able to compete with foreigners. Yet clocks are not often met with in China; they are generally confined to the public offices, where it is common to find half a dozen all in a row. The number annually manufactured cannot be large, for in the richest cities of China clock-makers are not numerous. At Nankin there are 40 shops; at Suchau, 30; Hangchau, 17; and at Ningpo, 7; the average number of men employed in each being less than four, who are mostly occupied in *repairing* watches and clocks. The cheapest clock they make costs \$7. Some are worth as much as \$100—the most common price being about \$25 each. A manufacturer estimates the number of clocks made at the above places at 1,000 per annum; and probably 500 more would more than cover the whole annual manufacture of the empire. A few watches are made, with the exception of chain and spring, which are imported. The oil used by Chinese workmen to abate friction appears to be particularly adapted for that purpose, though expensive; it is obtained from the flowers of the *Olea Fragrans*.

Before describing the kind of clock which seems adapted for this market, a brief glance at the history of the horological art in China may not be inappropriate. It had its rise, as in the western side of Asia, in the *clepsydra*.

Assuming—what is in the highest degree probable—the authenticity and accuracy of the *Shuking*, we find that, forty-five centuries* ago, the

* **CHRONOLOGY.**—Although doubts may exist respecting the absolute accuracy of Chinese chronology, it must, nevertheless, be admitted that it is so far correct as to render arguments founded on the commonly-received chronology altogether untenable; and it is matter of regret, therefore, that the latter has been followed, in their Chinese publications, by all Romish and Protestant missionaries. I cannot too earnestly urge the adoption of Hale's Chronology, and that speedily, lest, in the mean time, some Chinese Celsus or Porphyry should arise, and bring objections against our faith not easily answered to the satisfaction of their countrymen.

Chinese had occupied themselves with the construction of astronomical instruments somewhat similar to the quadrant and armillary sphere, and the observations they made with them, even at that remote period, are remarkable for their accuracy, enabling them to form a useful calendar. The present cycle of sixty was adopted at that time, by Hwangti, (2697-2597 B. C.) To this emperor is attributed the invention of the clepsydra. The instrument at that period was probably very rude, and not used as a time-piece, but for astronomical purposes, in the same manner as employed by Tycho Brahe, for measuring the motion of stars, and subsequently by Dudber in making maritime observations. It was committed to the care of an officer of rank styled clepsydra adjustor.

The greatest philosopher in Chinese history anterior to Confucius was Duke Chau, the alleged inventor of the compass. He appears, also, to have been the first to employ the clepsydra as a time-piece. He divided the floating index into one hundred equal parts, or "*kih*." In winter, forty kih were allotted to the day, and sixty to the night, and in summer this was reversed. Spring and autumn were equally divided. This instrument was provided with forty eight indices, two for each of the twenty-four terms of the year. They were consequently changed semi-monthly—one index being employed for the day and another for the night. Two were employed every day, probably, to remedy in a measure the obvious defects of all clepsydras—of varying in the speed of their rise or fall, according to the ever-varying quantity of water in the vessel, which might be done by having the indices differently divided. To keep the water from freezing in winter, the instrument was connected with a furnace, and surrounded by heated water. Chau flourished eleven centuries before our era. The forms of the apparatus have been various, but they generally consisted of an upper and a lower vessel, always of copper, the former having an aperture in the bottom, through which water percolated into the latter, where floated an index, the gradual rise of which indicated successive periods of time. In some this was reversed, the float being made to mark time by its fall. A portable one was occasionally employed, in ancient times, on horseback, in military tactics. Instruments constructed on the same principles with the above were in use among the Chaldeans and Egyptians at an early period—that of Ctesibius, of Alexandria, being an improvement over those of more ancient times. The invention of Western Asia was doubtless wholly independent of that of the East, both being the result of similar wants. Clepsydras were subsequently formed of a succession of vessels communicating by tubes passing through dragons, birds, &c., which were rendered still more ornamental by the indices being held in the hands of genii.*

The earliest application of motion to the clepsydra appears to have been in the reign of Shuenti, (126-145 A. D.) by Tsianghung, who constructed a sort of orrery representing the apparent motion of the heavenly bodies around the earth, which was kept in motion by dropping water. There is reference, also, to an instrument of this description in the third century.

* The accompanying drawings of two of the numerous forms of the instrument are from an old astronomical work, where they are found without any description.

In the sixth century, an instrument was in use which indicated the course of time by the weight of water, as it gradually came from the beak of a bird and was received into a vessel on a balance, every pound representing a *kih*. About this time mercury began to be employed, instead of water, which rendered the aid of heat in winter unnecessary. Changes were made also in the relative number of *kih* for day and night, so as to vary with the seasons.

As in Europe, monks of the Roman church devoted considerable attention to mechanical inventions, especially in the construction of instruments for measuring time for the regulation of their worship and vigils; in like manner, also, Buddhist monks, in their silent retreats, but at an earlier period, similarly occupied themselves, and for the same purposes. Several instruments, designed as time-pieces, the invention of priests, are mentioned in Chinese history. They present nothing novel, however, with the exception of one, which is nothing more than a perforated copper vessel, placed in a tube of water, which gradually filled and sunk every hour, requiring, of course, frequent attention. Although their knowledge of hydrodynamics has ever been very limited, the Chinese appear to have been the first to devise that form of clepsydra to which the term water-clock is alone properly applied; that is to say, composed of apparatus which rendered watching unnecessary by striking the hours. Until the commencement of the eighth century, the persons employed to watch the clepsydra in palaces and public places struck bells or drums every *kih*; but at this period a clock was constructed, consisting of four vessels, with machinery which caused a drum to be struck by day, and a bell by night, to indicate the hours and watches. No description of the works of this interesting invention can be found. It is possible, however, that the Saracens may have anticipated them in this invention of water-clocks.

In the history of the Tong dynasty, (620-907,) it is stated that in the Fahlin country, (which, in this instance, doubtlessly means Persia, though the best living authority amongst the Chinese makes it Judea,) there was a clepsydra on a terrace near the palace, formed of a balance, which contained twelve metallic or golden balls, one of which fell every hour on a bell, and thus struck the hours correctly. It is not improbable that this instrument is identical with the celebrated one which the king of Persia sent, in 807, to Charlemagne.

In 980 an astronomer, named Tsiang, made an improvement on all former instruments, and which, considering the period, was a remarkable specimen of art. The machine, which was in a sort of miniature terrace, was ten feet high, divided into three stories, the work being in the middle. Twelve images of men, one for every hour, appeared in turn before an opening in the terrace; another set of automata struck the twelve hours, and the *kih*, or eighths, of such hours. These figures occupied the lower story; the upper was devoted to astronomy, where there was an orrery in motion, which, it is obvious, must have rendered complex machinery necessary. We are only told that it had oblique, perpendicular, and horizontal wheels, and that it was kept in motion by falling water.

As the Saracens had reached China by sea at the close of the eighth century, and by land at an earlier period, some assistance may have been derived from them in the construction of this instrument; but I am disposed to consider it wholly Chinese. Beckman, after much learned research, ascribes the invention of clocks to the Saracens, and the first

appearance of these instruments in Europe to the eleventh century. Mention may here be made of other instruments of the same description, also constructed about this period. One (which, like the last, united an orrery and clepsydra) was formed in one part like a water-lily; whilst in another were images of a dragon, a tiger, a bird, and a tortoise, which struck the *kih* on a drum, and a dozen gods, which struck the hours on a bell, with various other motions, besides a representation of the revolution of the heavenly bodies. The machinery of another of these was moved by an under-shot water-wheel; its axis was even with the ground, and consequently the frame containing it was partly below the surface. The motions of the sun and moon, stars and planets, were made to revolve around a figure of the earth, represented as a plain from east to west. Images of men struck the hour, and its parts. In this, however, as in all the aforementioned instruments, the sounds struck were always doubtless the same, as the Chinese do not count their hours. Another machine was constructed which also represented the motions of the heavenly bodies. It was a huge, hollow globe, containing lights, and perforated on its surface, so as to afford, in the dark, a good representation of the heavens. This, also, was set in motion by falling water. Subsequently to this, various machines are mentioned, but the brief notices given afford nothing of interest, until we approach the close of the Yuen dynasty, the middle of the fourteenth century. Shungtsing, the last of the race of the great Genghis Khan, who is depicted in history as an effeminate prince, and as having the physiognomy of a monkey, was evidently a man of great mechanical skill, and to the last, when his dominions were slipping from him, and confusion reigned everywhere, he amused himself by making models of vessels, automata, and time-pieces. His chief work was a machine contained in a box seven feet high, and half that in width, on the top of which were three small temples. The middle of these temples had fairies holding horary characters, one of which made her appearance every hour. Time was struck by a couple of gods, and it is said they kept it very accurately. In the side temples were representations of the sun and moon, respectively, and from these places genii issued, crossing a bridge to the middle temple, and after ascertaining, as it were, the time of day from the fairies, returning again to their quarters. The motions in this case were, it is thought, effected by springs. An instrument somewhat similar is described as an ornament in the palace of the capital of Corea; it was a clepsydra, with springs, representing the motions of the celestial orbs, and having automata to strike the hour. Since the introduction of European clocks, clepsydras have fallen into disuse. The only one, perhaps, in the empire, is that in the watch tower in the city of Canton; it is of the simplest form, having no movements of any kind, but it is said to keep accurate time.

In dialling, the Chinese have never accomplished anything, being deficient in the requisite knowledge of astronomy and mathematics. It is true, the projection of the shadow of the gnomon was carefully observed at the earliest historic period; but this was for astronomical purposes only.*

* It was by a gnomon that the ancient Chinese endeavored to ascertain the centre of the earth. A measurement of the length of the solstitial shadow, made at Loyang, on the Yellow river, 1200 B. C., was found by Laplace (quoted by Humboldt, in *Cosmos*, vol. 2, p. 115) to accord perfectly with the theory of the obliquity of the ecliptic, which was only established at the close of the last century.

Proper sun-dials were unquestionably derived from the West; but they were not introduced, as Sir J. F. Davis supposes, by the Jesuits. The Chinese are probably indebted to the Mahomedans for this instrument, although we find an astronomer endeavoring to rectify the clepsydra, by means of the sun's shadow, projected by a gnomon, about a century earlier than the Hegira. There is a sun-dial in the Imperial Observatory at Peking, above four feet in diameter. Smaller ones are sometimes met with in public offices. These were all made under the direction of missionaries of the Roman church, or their pupils. From remote antiquity, a family named Wang, residing in Hiuning, north latitude $29^{\circ} 53'$, longitude E. G. $118^{\circ} 17'$, in the province of Canhwui, has had the exclusive manufacture of pocket compasses, with which sun-dials are often connected. In most of these, a thread attached to the lid of the instrument serves as a gnomon, without any adaptation for different latitudes, although they are in use in every part of the empire. Another form, rather less rude, is employed by clock-makers for adjusting their time-pieces; it is marked with notches, one for each month in the year, to give the gnomon a different angle every month. The Chinese instrument exceeds that of Corea in every respect.

Time is not unfrequently kept by igniting incense sticks, the combustion of which proceeds so slowly and regularly as to answer for temporary use tolerably well.

Hour glasses are scarcely known in China, and only mentioned in dictionaries as instruments employed in Western countries to measure time.

A native writer on antiquities says: "The western priest, Limatau, (M. Ricci) made a clock which rendered and struck time a whole year without error." The clock brought out by Ricci, if not the first seen in China, is the earliest of which mention is made in Chinese history. They subsequently became an article of import, and, as already mentioned, this branch of trade was at one time of considerable value. Clocks and watches of very antique appearance are often met with—specimens of the original models scarcely to be found in any other country; some of the latter, by their clumsy figure, remind one of their ancient name, "Nuremberg eggs;" but their workmanship must have been superior to that of most modern ones, or they would not be found in operation at this late day.

The Chinese must have commenced clock-making at an early period, as none now engaged in the trade can tell when or where it originated; nor can it be easily ascertained whether their imitative powers alone enabled them to engage in such an undertaking, or whether they are indebted to the Jesuits for what skill they possess. It is certain the disciples of Loyola had for a long time, and until quite recently, in their corps at Peking, some who were machinists and watch-makers. One of these *horologistes* complains, in "*Les Lettres Edifiante et Curieuse*," that his time was so occupied with the watches of the grandees that he had never been able to study the language. Doubtless the fashion which Chinese gentlemen have of carrying a couple of watches, which they are anxious should always harmonize, gave the fathers constant employment. A retired statesman of this province has published a very good account of clocks and watches, accompanied with drawings representing their internal structure, in a manner sufficiently intelligible.

The Chinese divide the day into twelve parts, which are not numbered, but designated by characters termed, rather inaptly, horary. These terms were originally employed in forming the nomenclature of the sexagenary cycle, (2657 B. C.,) which is still in use. It was not until a much later period that the duodecimal division of the civil day came into use, when terms to express them were borrowed from the ancient calendar. The same characters are also applied to the months. The first in the list (meaning son) is employed at the commencement of every cycle, and to the first of every period of twelve years, and also to the commencement of the civil day at 11 p. m., comprising the period between this and 1 a. m. The month which is designated by this term is not the first of the Chinese year, but, singularly enough, it coincides with January. Each of the twelve hours is divided into eight *kih*, corresponding to quarter hours. This diurnal division of time does not appear to have been in use in the time of Confucius, as mention is made in the spring and autumn annals of the *ten* hours of the day, which accords with the decimal divisions so long employed in clepsydras, the indices of which were uniformly divided into one hundred parts. A commentator of the third century of our era, in explaining the passage relating to the ten hours, adds a couple more; but even at that time the present horary characters were not employed.

The accompanying diagram represents the form I would recommend as suitable for the dial-plates of clocks manufactured for this market. The small characters on the outer circle are numerals, exactly corresponding to the Roman figures on Western clocks. The inner circle contains the twelve horary characters, and within these are the signs for noon, evening, midnight, and dawn. In the horary circle, the large single characters represent whole hours, and the small double ones half hours, equal to a whole European hour.

Let the minute hand extend to the inner part of the outer circle, and make *twelve* revolutions in a diurnal period. The hour hand should reach to the inner edge of the horary characters, and make one revolution in the same period of time. Let the pendulum vibrate seconds as now, and the minute hand, at the expiration of 60 seconds, make half a revolution. It should strike from 1 to 12 a. m. and p. m., and correspond in this respect to European clocks. It will be understood, then, that at our *even* hours the short hand will point to a large horary character—the middle of a Chinese hour—and the long hand will be *directly upward*; and at our odd hours the former will be opposite the small characters, which point the commencement of their hour, and the latter will point *directly downward*, or at the 12 p. m. of our clocks, or to repeat the same in another manner: at 1 o'clock p. m. our reckoning the hour hand will be half way between the large characters on the top and the next one to the right, and the minute hand, having made half a revolution, will point perpendicularly downwards, and the clock strike one. At the expiration of another of our hours, a whole Chinese hour will have expired when the former hand will have reached the first large character to the right, and the latter be directed to the zenith, the clock striking two.

After this perhaps unnecessarily minute description of what is wanted in the machinery, a few words remain to be added respecting the instrument as a whole. In the first place, it should be well made. A few

worthless ones would damage the business irreparably. They should be of brass, and placed in frames of wood, which will not be easily affected by atmospheric changes. Common pine wood, veneered with mahogany, have answered well. Spring clocks will not succeed. Some of this description, sent from New York, cannot be kept in repair; whilst a quantity of clocks moved by weights, manufactured chiefly in Connecticut, imported into China above seven years ago, have proved good time-pieces, and give no trouble.

With regard to the external appearance, on which so much depends, I would advise that, in every case, there be as much of the works exposed as possible through an opening in the dial plate. A Chinaman not only wishes to see what he is buying, but what is going on in his instruments when bought; and, as his countrymen have the merit of being extreme utilitarians, mirrors in the lower part of the door will be generally preferred to any other ornament. Some, however, should be ornamented at this point for the sake of variety; and perhaps nothing would please more than such a grouping of objects by the artist as would represent a river, bringing into view a steamboat and a sloop, and on the banks a railroad, locomotive, and cars; a steepled church, or a many storied hotel, in the distance; and a stage coach also. Or another interesting device would be afforded by a representation of the solar system; but this would need to be accompanied with several Chinese characters.

It is of primary importance that a particular description of the manner of using the clock, the mode of putting it up, setting it off, winding up, and regulating, should be given. These directions, which should be more minute than if designed for English readers, can be translated and printed very easily in this country. But there would be no difficulty in printing the directions by means of wooden blocks in the manufactory at home. In copying the characters for the dial extreme care is requisite that every stroke and each line should be represented exactly as given in the diagram. Astronomical characters or descriptions of any kind which may be needed by individuals trying the experiment of clock-making for China, I shall furnish most cheerfully, for the privilege of increasing the utility of the instrument by introducing with them a few passages of sacred Scripture.

It may be asked, why, if such a clock be needed by the Chinese, they have never constructed one for themselves? It is certainly marvellous that they should manufacture clocks, including dial plates, and always employ Roman figures, and follow the reckonings of foreigners, which so few of them are able to comprehend, and which by all are considered mysterious and outlandish. It is only to be accounted for on the ground of their limited inventive abilities and high powers of imitation. That a time-piece of this description would be in demand in China, I am perfectly satisfied from inquiries made of natives in various quarters. Chinese merchants say that they should be retailed at about \$5 or \$6 each. If I recollect rightly, they can be made in Connecticut at \$2 50, which would afford sufficient profit both for the mechanic and merchant.

NINGPO, *July 4, 1851.*

MEAT BISCUIT.

Extract from the Lecture of Professor Lindley, on substances used as Food: Illustrated by the Great Exhibition.

What is more important than all other preserved provisions is the article to which I must next request attention. A great deal of interest was excited when the contents of the Exhibition first became known—and it did not diminish afterwards—by a certain meat biscuit introduced among the American exhibitions from Texas by Mr. Gail Borden. We were told that its nutritive properties were of a very high order. It was said that ten pounds weight of it would be sufficient for the subsistence of an active man for thirty days; that it had been used in the American navy, and had been found to sustain the strength of the men to whom it had been given in a remarkable degree. Statements were made to us, which have since been corroborated, that it would keep perfectly well without change under disadvantageous circumstances. Colonel Sumner, an officer in the United States dragoons, who had seen it used during field operations, says he is sure he could live upon it for months and retain his health and strength. The inventor, he says, names five ounces a day as the quantity for the support of a man; but he (Colonel Sumner) could not use more than four ounces, made into soup, with nothing whatever added to it. The substance of these statements may be said to amount to this: that Borden's meat-biscuit is a material not liable to undergo change, is very light, very portable, and extremely nutritious. A specimen, placed in the hands of Dr. Playfair for examination, was reported by him to contain 32 per cent. of flesh-forming principles; for it is a composition of meat—the essence of meat—and the finest kind of flour. Dr. Playfair stated that the starch was unchanged; that, consequently, there could have been no putrescence in the meat employed in its preparation, and that the biscuit was in “all respects excellent.” It was tasted: I tasted it—the jury and others tasted it—and we all found nothing in it which the most fastidious person could complain of. It required salt, or some other condiment, as all these preparations do, to make them savory. This meat biscuit, as I said just now, was reported to be capable of keeping well; and this might well be true, because no foreign matter had been introduced into its composition. There was no salt to absorb moisture, and nothing else to interfere with the property of flour or of essence of meat. These biscuits are prepared by boiling down the best fresh beef that can be procured in Texas, and mixing it in certain proportions with the finest flour that can be there obtained. It is stated that the essence of five pounds of good meat is estimated to be contained in one pound of biscuit. That it is a material of the highest value there can be no doubt. To what extent its value may go nothing but time can decide; but I think I am justified in looking upon it as one of the most important substances which this Exhibition has brought to our knowledge. When we consider that by this method, in such places as Buenos Ayres, animals which are there of little or no value, instead of being destroyed, as they often are, for their bones, may be boiled down and mixed with the flour which all such countries produce, and so converted into a substance of such

durability that it may be preserved with the greatest ease, and sent to distant countries, it seems as if a new means of subsistence was actually offered to us. Take the Argentine republic, take Australia, and consider what they do with their meat there in time of drought, when they cannot get rid of it while it is fresh. They may boil it down, and mix the essence with flour, (and we know they have the finest in the world,) and so prepare a substance that can be preserved for times when food is not so plentiful, or sent to countries where it is always more difficult to procure food. Is not this a very great gain?

IX.

THE WORLD'S EXPOSITION OF 1851.

Presuming that an examination of, and a report on, the works of industry and art to be exhibited at the World's Fair would be advantageous to the agricultural and manufacturing interests of the Union, the following communication on the subject was addressed to the Secretary of the Interior:

PATENT OFFICE, *February 10, 1851.*

SIR: The present year will be one of unprecedented interest as regards the arts and industry of the world. The natural productions, the plastic arts, and the results of the inventive ingenuity of all nations—their machinery and manufactures—will be displayed side by side, their respective merits scrutinized, and prizes, it is announced, awarded by discriminating and impartial judges.

The United States have been invited to participate in the great course of material sources and productive skill, and, judging from the arrangements already made, they are likely to be largely represented in every department.

A report of such an exhibition of the skill, industry, and ingenuity of the world would be of the highest value to *this Office*, even if viewed only in relation to the various branches of invention of which it is the primary function of the Office to take cognizance. In discharging the daily duties of examining and deciding upon inventions, many questions arise which can only be decided by extensive researches among books, or in workshops and factories. The works pertaining to the arts contained in the Library of the Patent Office are too few in number to give all the information required, and, even if much more numerous, they would not serve to make known all the inventions that have been patented in foreign countries, of which many are not published till the patents expire, and others only in abstracts or imperfect descriptions.

Hundreds of minor devices and processes, simple and seemingly trifling accessories of staple mechanism, will be found there, of which it is equally important for this Office to be informed. These constitute a class of contrivances not found in books, and a knowledge of them is therefore highly desirable. Instances have occurred where patents have been issued for such, because evidence of their use in work-shops was lacking. They often present remarkable examples of simplicity and efficiency, and of neat turns of mechanical thought, which few besides practical men can appreciate. Of course none but the eye of one familiar with the details of modern manufactures and arts could detect them.

The usefulness of such a report, however, would not be confined to the immediate operations and duties of this Office. If prepared with due

regard to the state of the arts in this country, and to the ground which we have yet to occupy, it would, by becoming a work of reference among farmers, mechanics, manufacturers, artists, and inventors, react favorably on the future transactions of the Office—often relieving it from the necessity (always disagreeable) of refusing in cases lacking the essential features of novelty. Inventors would be apprized of many facts necessary to be understood before applying for patents; and, while deriving useful hints from the inventions of foreign nations, they would probably be spared the mortification of finding too late that they had, in some important points, been anticipated, and thereby avoid the waste of much time, ingenuity, and money.

From the nature and extent of the proposed exhibition, it is believed that much of the inventive talent of the world will be presented in its most recent developments. The direct utility of the information which may be there collected, and which is not elsewhere attainable, will, it is thought, be sufficiently important to warrant the expense of collecting it, for the purpose of embodying it in the Annual Report of this Bureau. Accompanied by necessary illustrations, the documents would be of lasting interest.

Under the impression that the Commissioner of Patents has no authority to depute any person or persons for the purpose of making such a report at the expense of the Patent Fund, I beg to call your attention to the subject, and solicit for it your consideration. The reporter should, of course, be a person thoroughly conversant with mechanical science and the entire range of the arts, and it would be well were he attended by an assistant and draughtsman.

I have the honor to be, very respectfully, your obedient servant,
THOS. EWBANK.

Hon. ALEX'R H. H. STUART,
Secretary of the Interior.

One of the clerks of this Office, who had been sent out in charge of the articles shipped in the St. Lawrence, was authorized by the Department of the Interior to remain and report on the contents of the Crystal Palace with special reference to such substantial arts and inventions as should be found more immediately adapted to the United States—to the development of our resources and to the genius and condition of our people.

As no report has been made by him, the undersigned solicited of the Executive Committee for the United States the one made to that committee by Mr. Riddle, the American Commissioner. It was politely furnished, and, with the accompanying letter, is here presented.

WASHINGTON, January 27, 1852.

SIR: By order of the Executive Committee on the London Industrial Exhibition, the following resolution, which was adopted at a meeting of said committee, held on the 20th instant, is hereby transmitted to you:

"On motion, *Resolved*, That the chairman and secretary of the Executive Committee communicate to the Commissioner of Patents, in

compliance with his request, the report of Mr. Edward Riddle on the Industrial Exhibition, for publication as a portion of the Patent Office Report."

In compliance with the above, the report is herewith transmitted.

Very respectfully, your obedient servant,

PETER FORCE, *Chairman.*

JNO. C. G. KENNEDY,
Secretary.

HON. THOMAS EWBANK,
Commissioner of Patents, Washington.

REPORT ON THE WORLD'S EXPOSITION

BY EDWARD RIDDLE.

PART I.—CHEMICAL AND PHARMACEUTICAL PRODUCTS.

In this class of the department appropriated to Great Britain for the display of raw materials was found little that was interesting, or much that was inquired into, by the majority of those who daily visited the building; but to others—to those who had a higher aim in view than a mere cursory glance at objects of unseemingly interest to the scientific and practical chemist—in fact to all who sought to acquire knowledge rather than amusements—there was presented an ample field for inquiry, and a large scope for gathering valuable information.

Chemistry was known to the ancients only as the art of "making silver and gold," or what is more generally known by the name of alchemy. Various definitions of its modern meaning have been given—that by Dr. Black being most generally received, namely, that "Chemistry is the study of the effects of heat and mixture, with a view of discovering their general and subordinate laws, and of improving the useful arts."

From the earliest times to the seventh century the operations in chemistry were limited to expressions, digestions, and decoctions, and it may be naturally inferred that at this period the dawn only of chemistry had begun, and that it was rather a collection of unconnected and ill-founded axioms, the result of observation, than a science established upon the broad basis of an infinite variety of experiments.

From the seventh to the seventeenth century several important facts were discovered, and several products added to the few already known; the chief of these discoveries being the process of making sulphuric acid from green vitriol, or sulphate of iron, of nitric acid from nitre, and hydrochloric acid from common salt. Several salts and some alkaline bodies were also discovered, or more perfectly known.

Of the earths in general, but little was known, and even that little was unsupported by the principles of chemistry. Clay was distinguished from sand, but not by its genuine chemical characters.

About the year 1674 Sir Isaac Newton contributed some new and general ideas on chemical phenomena to the Royal Society. He observes

that sugar dissolves in water, alkalies unite with acids, metals dissolve in acids; and he inquires whether these effects are not occasioned by an attraction between their particles? Copper dissolved in aquafortis is thrown down by iron. Is not this, he inquires, because the particles of the iron have a stronger attraction for the particles of the acid than those of copper, and do not different bodies attract each other with different degrees of force?

From the seventeenth to the commencement of the present century little further advancement was made in this science; but from that period to the present time chemistry has received a marked impulse from the unremitting attention of the most eminent men of nearly all nations; discoveries have been made, inventions brought out, and systems promulgated, which would have astonished the world had they occurred at an earlier period; and this, too, not only as applied to the purposes of medicine, manufacture, &c., but also, and that to a very great extent, as connected with agriculture.

In a commercial point of view, chemistry has also made some very rapid strides. Within the last twenty years the manufacture of caustic and carbonate of soda has originated and developed itself to a degree almost unparalleled in the history of commerce. The fires of the kelp business on the coasts of the islands of Scotland are scarcely now extinct, when vast factories, employing large numbers of individuals, produce, in enormous quantities, the same alkali which, until recently, was derived from the fused ashes of marine plants. The manufacture of this alkali, by an ingenious decomposition of common salt, by the simple aid of sulphuric acid, chalk, saw-dust, and coal, is now prosecuted to a vast extent for the supply of the industrial arts generally, the quantity used in medicine being comparatively insignificant. At some alkali works, fifty and sixty tons, and upwards, of common salt are decomposed every week, and converted into caustic and carbonate of soda. The alum factories are not less extensive; at these establishments crystallizations, on a scale emulating those of nature, are constantly in progress. The manufacture, also, of sulphuric acid, and of the compounds used by the dyer and calico printer, occupies a prominent feature of commercial enterprise.

The prussiates of potash, forming large masses of yellow and red crystals, and the green but perishable crystals of copperas, are substances largely used in the arts, and the colors and dyes produced by their assistance present themselves in every direction when textile printed fabrics are examined.

Amongst the varied specimens of chemical and pharmaceutical products displayed, were many worthy of notice, and, taken throughout, they formed a valuable collection, and furnish remarkable illustrations of the extensive applications of chemistry to modern arts and manufactures.

Crystal of Copperas, or Sulphate of Iron.—T. Bramwell & Co., New-castle-upon-Tyne.

This substance, so largely used in the arts for dyeing, &c., and also in chemistry and pharmacy, is obtained, as a natural product, from aluminous chalybeate springs, as well as by the spontaneous decomposition of certain native sulphurets of iron, or iron pyrites; and is prepared in

large quantity by the action of air and water. The sulphur and iron are thus both oxidated; and sulphate of iron, or copperas, is obtained by crystallizing the lixiviated masses.

Crystallization, and the circumstances under which it takes place, form an interesting subject of inquiry. Not having the operations of nature open to our inspection, our only sources of information relative to the formation of crystals are those afforded by the process of artificial crystallization; and here, until very recently, our experiments were circumscribed by a very few modes of operation: that of the deposit of crystals from solution in some fluid; their production while gradually cooling from a state of fusion; and their volatilization by heat, or otherwise. Latterly, however, by the aid of that universal agent—electricity—new methods of producing crystals have been pursued; and there can now be little doubt that all the phenomena of crystallization are governed, in a greater or lesser degree, by electric influence.

Specimens of Crystallized Alum and Bicarbonate of Soda.—W. Patterson, Newcastle-upon-Tyne.

The first of these products is also extensively used in the arts, as well as in chemistry and medicine. It is an earthy salt, and occurs in a native state only in small quantities. In a great measure, however, it is prepared artificially from alum slate—a rock belonging to the coal formation, and containing a considerable proportion of sulphur, iron, and alumina. The slate is broken in pieces, roasted, exposed to air and moisture; and, the soluble parts being dissolved in water, crystals of alum are obtained as the solution cools.

Bicarbonate of soda is chiefly used in medicine, and may be obtained by passing carbonic acid through a concentrated solution of the carbonate.

Camphor and Borax.—Howards & Kent, Shatford, London.

Camphor is one of the principles arising from the separation of the volatile oil of two trees: the one, a native of Japan and China; the other, a native of Borneo and Sumatra. From these it is procured by different processes. It exists in every part, root, stem, branches, and leaves of the first-mentioned tree, which is chopped into pieces sufficiently small to be thrown into iron vessels. These vessels are afterwards covered with earthen hoods, in which are placed rice, straw, and rushes; heat being subsequently gradually applied. The camphor is volatilized, and afterwards condenses on the straws, rushes, &c. This, after being purified from the intermixture of straw, is found in commerce under the name of crude camphor; but it still retains many impurities, and on arrival in Europe is refined. The tree is familiarly known in this and other temperate countries as an ornament of conservatories. It is a graceful evergreen tree, whose wood and leaves emit, when bruised, an agreeable camphoraceous odor. In the camphor tree of Borneo, on the contrary, the volatile oil is not procured by distillation. The camphor here occupies the place of the pith of the tree, existing in its stem, in a crude solid form, along with camphor oil.

Camphor has been long and extensively used in medicine; but even yet its physiological and therapeutic actions have not been fully discovered, from the fact that more systematic inquiries have not been made as to its medicinal results.

Borax is, in reality, a compound of boracic acid and soda, correctly termed baborate of soda. It is chiefly brought from the East Indies, Persia, and Ceylon, and also from a lake in Thibet entirely supplied by springs, where it is collected by the natives from the edges in a state of crystallization. It is imported under the name of tincal. The crystals are bluish, or greenish-white, and sometimes nearly transparent, as well as soft and brittle. It is purified by solution in water and crystallization, and is then sold as borax.

On the continent, borax is prepared by decomposing carbonate of soda with the boracic acid of Tuscany, and purifying the baborate by various processes.

Little is yet known of the medicinal actions of borax. Its chief use in the arts is for glazing porcelain and making green fire.

Ferrocyanide of Potassium, used for Dyeing Blue, in place of Indigo.—
T. Bramwell & Co., Newcastle-upon-Tyne.

This is perhaps one of the most important chemicals used in the art of dyeing, and calico printing. Its preparation consists in projecting a mixture of pearl ashes with hoofs, horns, and other animal matters, in the proportion of two to five, into a red-hot iron crucible, and stirring diligently the pasty mass thus formed until fetid vapors cease to arise from it. When the product has cooled, it is lixiviated with cold water, filtered and concentrated, upon which yellow crystals of ferrocyanide of potassium are formed. By the addition of a salt of iron to ferrocyanide of potassium, that most beautiful blue, called Prussian blue, is produced.

A Pyramid of best Table Salt, with several other specimens of salt.—F. Cheshire, Northwich.

These specimens of salt were from the extensive mines of Northwich, in Cheshire, where there are also brine springs. They are of two kinds—the one white and transparent, the other of a reddish-brown. The rock salt is found from 28 to 48 yards beneath the surface of the earth. The first stratum is from 15 to 20 yards in thickness, extremely solid and hard, resembling sugar candy. Many tons at a time are loosened by blasting with gunpowder.

The second stratum is of hard stone, from 25 to 35 yards in thickness. The salt lies beneath this stratum in a bed above 40 yards thick, generally perfectly white, and clear as crystal. It is stated that the annual production of salt in England is upwards of 800,000 tons, and the population engaged in its manufacture 11,000 to 12,000. The sources of supply are said to be inexhaustible; and latterly the salt manufacturers have so far extended their works that the opening of a new market would be of the greatest advantage. Common salt, for ordinary purposes, can now be obtained at about 20 shillings sterling per ton. In India the British government monopolizes both the manufacture and sale of salt, and the exportation of British salt to India is prohibited. Attempts have been

made by the salt manufacturers and ship owners to obtain admission for British salt into the ports of India at a moderate duty; and the latter, especially, complain of disadvantage of not being allowed to take so convenient an article of merchandise to that part of the British empire. The salt monopoly had existed in India long before the sway of the East India Company commenced; and its modification, or total abolition, is considered only as a question of time. It is believed that a moderate duty on salt would soon yield quite as large a revenue if the monopoly were abolished, while commerce would be benefited by the exchange of sugar and other commodities for salt; smuggling in salt, which is extensively carried on, would cease; and, in place of arbitrary and harsh restrictions, the consumer would obtain a better article at a much cheaper rate.

Refined Indigo.—John Marshall, Leeds.

This substance is the innoxious and beautiful product of an interesting tribe of tropical plants, and is very extensively employed in dyeing and calico printing; being esteemed the most useful and substantial of all dyes. When the plant is in full flower it contains most coloring matter. It is then cut, dried, put into vats, and covered with water; fermentation takes place, accompanied with the evolution of carbonic acid, and other gaseous products, and the yellow liquor is covered with a froth. This froth, in a little time, becomes of a violet color, and a substance is evolved, which is rendered blue by absorbing oxygen of the air, and, being thus rendered insoluble, is precipitated. This, when collected and dried, is indigo.

Specimen of Ultramarine.—Gorton & Co., City road, London.

This is a well known blue pigment of extraordinary beauty. Until within the last few years it was entirely prepared from the lapis lazuli, or lazulite, and from the great costliness attending its preparation, its use was confined to the artist. It is now prepared artificially, at a very moderate rate, and equal in beauty to that obtained from the lazulite. It is stated that by adding freshly precipitated silica and alumina, mixed with sulphur, to a solution of caustic soda, evaporating the mixture to dryness, and placing the residue, in a covered crucible, and exposed to a white heat, where the air has partial access to it, a pure ultramarine is obtained. The product is then reduced to impalpable powder. The proportions of materials to be used are about 36 silica, 36 alumina, 24 soda, and 3 sulphur. Since this discovery, its value has become very much reduced, and it is now used extensively in the arts.

Specimen of Carmine.—J. Leichfield, Clapton, London.

This beautiful product is obtained from cochineal, and is so valuable an article as to be rarely met with in a state of purity. It is obtained by the following process: boil 12 pounds of filtered rain-water in a tin vessel, and add to it four ounces of finely-powdered cochineal; boil for five minutes, constantly stirring with a glass rod; then add five scruples of alum in fine powder, perfectly free from iron; boil again for two minutes, remove the vessel from the fire, cover it, and allow the contents to settle.

As soon as the liquor is clear, pour it, while still hot, into glass or porcelain vessels, and suffer it to remain some days, covered from dust. The alum gradually precipitates the coloring matter, in combination with animal matter and a little alumina. The precipitate is put on a filter, washed, and dried in the shade. It is one of the most beautiful red colors used by painters.

Several Specimens of Wood preserved by Chemical Process.

All wood contains what is called albumen—an essential ingredient in vegetable bodies, entering largely into the composition of the sap. As long as this albumen is supplied with sufficient moisture, so long will it be liable to enter into a kind of fermentation, especially if placed in damp or ill-ventilated situations, and often even where the ventilation is perfect, and the atmosphere in its ordinary state of humidity. If a piece of green timber, containing this albumen in a perfect state of solution in the moisture of the wood, be employed in the construction of a house, the albumen undergoes fermentation, and the rot and decay of the wood speedily follow.

How is this waste and destruction of wood to be prevented? To a certain extent, by thoroughly drying the timber in a current of air. This, however, takes considerable time to effect. For instance, a large piece of oak requires exposure for eight or ten years to dry it completely. This is demonstrated by the fact that it loses weight for that period. We may apply heat to hasten the process of drying, but the wood, when exposed to the ordinary temperature of the atmosphere, absorbs moisture in quantity varying with the compactness of the wood. In a dry room, without a fire, the quantity of water reabsorbed by wood amounts, on an average, to ten per cent. As long as the albumen of the wood is supplied with sufficient moisture to render it soluble, so long will there be danger of dry rot. The best plan, therefore, to adopt is, to render this albumen perfectly insoluble, so that, however much moisture shall be absorbed, it cannot be brought into an active state again. For this purpose, Sir H. Davy recommended that the wood should be steeped in a solution of corrosive sublimate—a salt, called bichloride of mercury by chemists, which has the property of forming an insoluble compound with the albumen, and thus preventing its further action. This process was commercially applied by Wm. Ryan; but, from the great expense attending the preparation, and the fear that the use of this poisonous salt might prove deleterious to the health of persons coming in contact with it, the employment of corrosive sublimate has been abandoned. Creosote oil, obtained from wood and coal tar, has been used with great success; but this also possesses a disadvantage, as it imparts a disagreeable odor, and increases the inflammability of the wood.

Some of the specimens exhibited by Mr. Payne are prepared, first, by injecting a soluble salt of baryta into the pores of the wood, and then adding solution of sulphate of iron. By this means a compact solid substance is formed, which remains in the wood, thereby increasing its weight, and partly converting it into stone. Sir W. Barnett & Co. have some specimens prepared by injecting chloride of zinc into the pores of the wood. This substance makes the albumen perfectly insoluble, even in sea-water, does not communicate any color or odor to the wood,

renders it less inflammable, whilst its use is perfectly innocuous in a sanitary point of view.

Vegetable and Animal Substances used in Manufactures.

This class, although embracing a variety of substances, was not an extensive one, the chief and most interesting features relative to vegetable substances having been those comprised in the growth and manufacture of flax and hemp, including preparations by Claussen's patent.

Of the flax plant there are several varieties in cultivation, the best seed coming from Riga and Holland. As the different varieties arrive at maturity at different times, and the stem rises to different heights, it is very essential that the seed be not mixed, as this would occasion great inconveniences and loss in the pulling of the flax. The most common variety of flax in Great Britain is of a moderate length, with a strong stem. If it is not sown very thick, it will throw out branches at the top, and produce much seed. It is, therefore, a matter of calculation whether it will be most profitable to have finer flax, with less seed, or an inferior quality of flax, and an abundance of seed. There is a small variety which does not rise above a foot, grows fast, and ripens its seed sooner. When the principal object is to get linseed, this variety is preferred; but the flax is shorter, and also coarser.

The soil best adapted to the growth of flax is a deep, rich loam, in which there is much vegetable mould. It should be yellow, and loose to a considerable depth, with a sound bottom, neither too dry nor too moist. Either of these extremes invariably destroys the flax. It is, therefore, not suited either to hot, gravelly soils, or cold, wet clays; but any other soil may be so tilled and prepared as to produce good flax. The land should also be free from weeds, as the weeding of this crop forms a very important item in the expense of cultivation. These circumstances suggest the following mode of preparing the land: a long fallow, including two winters and a summer, will be a good preparation for the heavier loams, which should be trenched, ploughed, and worked deep. The manure generally used is rotten dung, or a compost of earth and dung, or some artificial dressings. If the land is sufficiently clean, a crop of potatoes, well manured, may be substituted with advantage for the fallow. Flax has also been found perfectly successful, when grown after clover, on a single ploughing, especially if the clover be biennial. The stubble of the clover is ploughed up, either in the spring or autumn, with some care, and then the harrow and roller are passed over the ground before sowing. If the soil contains a great portion of clay, lime may be used with advantage; but in the lighter loams it may be dispensed with. At all events, it should not be used immediately before the flax is sown, but for some previous crop. Peat ashes make an excellent manure, as they improve the soil, and keep off insects, which are apt to injure the roots of the flax. For want of peat ashes, those made by the burning of weeds and earth in a smothered fire are a good substitute. There is another manure, also, which has been found to answer exceedingly well, composed of the sweepings of streets in towns, mixed with night soil. Where night soil cannot be obtained in sufficient quantities, rape cakes, from which the oil has been expressed, dissolved in cows' urine, form a very excellent manure.

When the flax begins to get yellow at the bottom of the stem, it is time to pull it, if very fine flax is desired, such as is made into thread for lace or fine cambric; but then the seed will be of little or no value. Every flax-grower judges for himself what is most profitable on the whole. The pulling is done carefully by small handfuls at a time. These are laid upon the ground to dry, two and two, obliquely across each other. Fine weather is essential to this part of the operation. Soon after this they are collected in larger bundles, and placed with the root end on the ground, the bundles being slightly tied near the seed end. The other end is spread out, that the air may have access, and the rain not damage the flax. When sufficiently dry, they are tied more firmly in the middle, and stacked on the ground till the next season. Some carry the flax, as soon as it is dry, under a shed, and take off the capsules with the seed by rippling. Sometimes, if the capsules are brittle, the seed is beaten out by means of a flat, wooden bat. The flax is then, according to usual process, immediately steeped. By Claussen's invention, this method, to a certain extent, is dispensed with, the pure fibre being more easily and rapidly separated from the wood. As this process has excited great attention, both in this country and Europe, it is certainly deserving of a fair trial. In order to explain it as far as possible, we cannot, perhaps, do better than to use the Chevalier's own words.

In alluding to some remarks which appeared in the *Morning Chronicle* upon a system which involves the necessity of steeping the flax in one form or other, he says:

"The remedy for this state of things is a perfectly simple one, and consists merely in placing at the disposal of the grower the means of reducing the bulk of his flax crop without resorting to steeping, so as to admit of its easy and convenient transit to the best and most advantageous market.

"The grower of flax will not then be compelled to dispose of his produce upon the terms which may be offered by an individual possessing the exclusive right of preparation under any system, but may avail himself of the facilities which the great extension of the railway system provides for sending his crop, reduced both in weight and bulk, to any market where better prices may be obtained. I am as deeply interested as any person in upholding the rights of inventors, and of persons holding licenses under them; but I protest I would infinitely rather prefer sacrificing my own interest in the matter, and throwing open my invention to the public, than consent to derive advantages obtained at the expense of a class of producers for whose prosperity I have, from my youth, felt the deepest interest, and in whose pursuits and employments many of the happiest years of my life have been passed.

"That a reduction of the bulk, by a partial separation from the stem of the flax plant, may be effected without steeping, and by a very simple and unexpensive mechanical process, is a point which is now completely set at rest. All that is required is simply to pass the stem between a pair of rollers, or break it by means of a common 'breaker,' after which the straw may be separated by any beating motion with the most perfect ease. The cost of a hand-machine for this purpose would be about £10, and may be used, without payment for license or royalty, by any grower of flax in the United Kingdom. The flax so prepared, according to the report of the Royal Flax Society, is peculiarly well adapted to the man-

ufacture of sail cloths, standing and running rigging, ropes, canvas, nets, bags, and other coarse articles for manufacture. It is also excellently adapted for the after-treatment required in order to prepare it for spinning, alone or combined with cotton, silk, or wool, upon the ordinary machinery. In addition to these large and important markets, it is also equally available for the great and growing branch of the linen manufactures, for which it is considered necessary that the flax should be steeped either in cold or hot water previous to being spun. Mr. McAdam, the secretary of the Royal Flax Society, when shown at the meeting of the Royal Agricultural Society some samples of the flax thus partially cleaned without steeping, expressed his belief that considerable advantages would be derived from such a complete or partial separation of the straw or woody part of the plant previous to steeping.

"The two great advantages which would be gained from the treatment of the flax in this state, as compared with the present mode of steeping it while in the straw, would be the greater quantity which it would be possible to put into the steep vats, and considerable reduction of the period at present required for steeping.

"In addition to the advantages which the grower would derive from this partial removal of the straw and diminution of the bulk of his crop, by being enabled to avail himself of the best market for his produce, he would also be enabled to return to the soil, in the shape of manure, a large portion of the crop which would otherwise be lost to it.

"Thus, for instance, a grower having four tons of flax in the straw, would, by the separation of the straw by a purely mechanical process, obtain from two to three tons of a material of equal, if not of greater value, than wheat-straw, which would be available for mixing with linseed, or other articles of cattle food, and thus increase the quantity and value of the manure. He would also have the means of profitably providing more constant and steady employment for his laborers, as such preparation of the flax might be carried on at times when the state of the weather, or other circumstances, rendered field labor impracticable."

The report of the Royal Agricultural Society states the advantages connected with this mode of preparing flax, to be the following:

"That by the new process flax is rendered capable of being spun, either in whole or in part, on any existing spinning machinery.

"That the fibre to be mixed with cotton, or spun alone on cotton machinery, is so completely assimilated in its character to that of cotton, that it is capable of receiving the same rich opaque color that characterizes all dyed cotton; and, consequently, any cloth made from flax-cotton yarn can be readily printed, dyed, or bleached by the ordinary cotton process.

"That flax-fibre can be always produced with profit to the British grower at a less price than cotton can be imported into this country with profit to the foreign producer.

"That, as a consequence of this advantage, the manufacturers of this country will be less dependent on the fluctuations of the cotton-crop for a supply of the raw material, and a more regular employment will be given to the manufacturing population.

"That with respect to the advantages of being able to spin flax, in combination with wool, on the existing woollen machinery, the first is, that the flax prepared by M. Claussen is capable of being 'scribbled,'

‘spun,’ ‘woven,’ and ‘milled,’ in all respects as if it were entirely wool, having an advantage in this respect over cotton, which has not the slightest milling properties. On the contrary, the flax fibre is capable of being even made into common felt hats with or without an admixture of wool. To such an extent has the milling property of flax been proved, that the sample of cloth exhibited had been woven 54 inches wide, and milled up to 28 inches wide.

“That the flax fibre will not, under any circumstances, when prepared for spinning with wool, cost more than from 6d. to 8d. per pound; while the wool with which it may be mixed will cost from 2s. to 4s. per pound; consequently, reducing the price of cloth produced from this mixture 25 or 30 per cent. below the present prices of cloth made wholly from wool, and being of equal if not greater durability.

“That short wool refuse, which cannot by itself be spun into a thread, may, by being mixed with this thread, be readily spun and manufactured into serviceable cloths.

“That, by this process, flax may be also prepared as to be spun in any certain proportions with silk upon the existing silk machinery; that, when so spun, it is capable of receiving considerable brilliancy of tint; that the fibre may be prepared for thus spinning at a uniform price of from six pence to eight-pence per pound; that, as it may be spun in any proportion with silk, it is evident that the price of the yarns must be reduced according to the relative proportions of the materials employed—thus extending the markets, and giving increased employment to the operatives.

“And, lastly, that, by M. Claussen’s plan of bleaching, any useless flax can be converted into a first rate article for the paper-maker at a less price than the paper-maker is now paying for white rags, and suitable for the manufacture of first class paper.”

In following M. Claussen in his remarks upon the preparation of flax-cotton, according to his process, he states as follows:

“The principle of the invention by which flax is adapted for spinning upon cotton, wool, and silk, independent of flax machinery, consists in destroying the cylindrical or tubular character of the fibre by means of carbonic or other gas, the action of which splits the tubes into a number of ribbon-like filaments, solid in character, and of a gravity less than cotton; the upper and under surfaces of which are segments of circles, and the sides of which are ragged and serrated. In order to explain the nature of the process by which this change is effected, it is necessary first to explain the structure of the flax plant. The stem of the plant consists of three parts—the wood, the pure fibre, and the gum resin, or glutinous matter, which causes the fibres to adhere together. In the preparation of the plant for any purpose of fine manufacture, it is necessary first to separate from the pure fibre both the wood and glutinous substance. The former of these may be removed by mechanical means, previously referred to, almost as simple as those employed in the threshing of wheat. In order, however, to remove the glutinous substance from the fibre, recourse must be had either to the fermentation produced in the steeping process, or to some other chemical agent. The present system of steeping in water, whether cold or hot, is, however, ineffectual for the complete removal of the glutinous substances adhering to the fibres, a large per-centage of which is insoluble in water. The first process, there-

fore, which it is necessary to adopt in the preparation of flax-cotton, is to obtain a perfect and complete disintegration of the fibres from each other by the entire removal of the substance which binds them together.

"This is effected by boiling the flax for about three hours, either in the state in which it comes from the field, or in a partially cleaned condition, in water, containing about one-half per cent of caustic soda. After undergoing this process, the flax is placed in water, slightly acidulated with sulphuric acid—the proportions of acid used being one to 500 of water. Any objections urged against the employment of such substances, even in the small proportions above stated, are at once met by the fact that the soda present in the straw, after the first process, neutralizes the whole of the acid, and forms a neutral salt, known as sulphate of soda. This process, producing as it does a complete separation of the integral fibres from each other, is equally adapted for the preparation of long fibre for the linen, or of short fibre for the other branches of textile manufacture. When required to be prepared for linen, all that is necessary after the above process is to dry and scatch it in the ordinary mode. The advantages which this mode of preparation possesses over any other mode in use are stated in the official report of the Royal Agricultural Society to be as follow:

1. "That the preparation of long fibre for scatching is effected in less than one day, and is always uniform in strength and entirely free from color, much facilitating the after-process of bleaching, either in yarns or in cloth.

2. "That it can be also bleached in the straw at very little additional expense of time or money.

3. "That the former tedious and uncertain modes of steeping are superseded by one perfectly certain, with ordinary care.

4. "That, in consequence of a more complete severance of the fibres from each other, the process of scatching is effected with half the labor usually employed."

"Complete, however, as may be the separation produced by this mode of treatment, the fibres, from their tubular and cylindrical character, are still adapted only for the linen or present flax manufactures, as their comparatively harsh and elastic character unfits them for spinning on the ordinary cotton or woollen machinery. At this stage, therefore, it is that the most important part of the invention is brought into operation. The flax, either before or after undergoing the processes required for the severance of the fibres, is cut by a suitable machine into the required lengths, and saturated in a solution of sesqui-carbonate of soda (common soda) a sufficient length of time to allow of the liquid entering into, and permeating by capillary attraction, every part of the small tubes. When sufficiently saturated, the fibres are taken out, immersed in a solution of dilute sulphuric acid, of the strength of about one part to 200 parts of water. The action of the acid on the soda contained in the tube liberates the carbonic gas which it contains; the expansive power of which causes the fibres to split, and produces the result above described. The fibre is then bleached, and, after having been dried and carded in the same manner as cotton, is fit for being spun upon the ordinary cotton or woollen machinery.

"The practicability of transforming flax into this cotton-like substance was demonstrated by Professor Way as follows:

“ ‘Although we have long been practically familiar with the expansive effects of æriform fluids suddenly disengaged chemically from an apparently solid and inert substance like gunpowder, either in fire-arms or the blasting of rocks, and with their elastic recoil when released from the pressure of condensation, as in the air-gun or the liquid gases of Dr. Farrady we were not prepared for so beautiful an instance of the application of this principle as the one Chevalier Claussen has given us in the splitting of vegetable fibres by conveying into its interstices the carbonic acid gas concealed in condensation and chemical alliance with soda, and then setting it free by the addition of acid, which breaks off that alliance by its own superior elective affinity for the alkali. The flax fibre, soaked in the solution of sub-carbonate of soda, was no sooner immersed in the vessel containing the acidulated water than its character became at once changed from that of a damp, rigid aggregation of flax to a light, expansive mass of cottony texture, increasing in size like leavening dough, or an expanding sponge. This change was no less striking when this converted mass, in its turn, was placed in the next vessel, which contained the hypo-chlorite of magnesia, and became at once bleached, attaining then the color, as it had just before received the texture, of cotton.’ ”

Some objections have been taken to this process by persons who appear to regard flax as a material which ought to be solely applied to the manufacture of linen or cambric, and think that any preparation of it which does not best adapt it to the manufacture of these fabrics is to be discountenanced. The attempt to substitute flax for cotton has even been stigmatized as a *reductio ad absurdum* by an extensive flax-grower and manufacturer in Belgium, and who also expressed his opinion that any invention by which cotton could be transformed into flax would be justly entitled to the merit of a great discovery.

The objection is founded upon the supposition that the fibre is greatly reduced in strength by the process resorted to. When compared with fibre of an equal degree of fineness, prepared upon the most improved methods of steeping, the results have been decidedly in favor of the mode just described. When the fibres, however, are split, it is perfectly natural to suppose, inasmuch as “a part is less than the whole,” that the filaments into which they are split are not of the same strength as the fibres of which they originally formed a part. The strength of the fibre is reduced in proportion to the division of the parts which takes place, and is not impaired by the action of any of the chemical ingredients employed. The strength of the fibre, when brought into a fit state for the cotton-spinner, is not, therefore, to be compared with that required for the stronger and more durable linen yarns, but with that for which it is intended to be used as a substitute or auxiliary—namely, cotton or wool, with which it will bear the closest comparison.

Should the grower of flax not be disposed to undertake the complete preparation of his produce, and the existence of markets in his immediate neighborhood for the flax in the straw should render it unnecessary for him to reduce its bulk, the sale of the flax in that state would be attended with profit greater than can be obtained from any ordinary crops, as shown by the following statement made by Mr. Druce, of Ensham, in Oxfordshire, the piece of ground on which his flax was grown consisting

of a deep-red loam, in extent 5 acres, 2 rods, and 36 perches. His profits were as follow:

Expenses of Cultivation.

	£	s.	d.
One ploughing, at 10s. per acre	-	2	17
Sowing and harrowing, at 1s. 6d. per acre	-	-	8
Weeding, at 2s. per acre	-	-	11
Flax-seed, 13½ bushels, at 9s.	-	6	1
Rent of land, at 4s. 8d. per acre	-	13	14
Taxes, at 6s. per acre	-	1	14
Pulling flax, at 1s. 4d. per acre	-	4	0
Carting and stocking, at 4s. per acre	-	1	2
Threshing	-	5	7
Winnowing	-	-	12
Total expenses	-	36	10
		==	==

Sale of Produce.

	£	s.	d.
Sale of flax-seed, 201¼ bushels per acre, 116¼ bushels, at 8s.	46	10	0
Sale of flax straw, 12 tons, 2 cwt., 2 qrs., at £3 per ton	36	7	6
Sale of chaff, at 5s. per acre	-	1	8
Total receipts	-	84	6
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Thus leaving a net profit of £47 15s. 9d.—being equal to £3 6s. 2d. per acre of land employed in this trial of flax cultivation.

It may not be improperly asked, why, if the cultivation of flax be so advantageous, it has not been more generally carried out in England? The answer to such an inquiry may readily be found in the difficulties which have hitherto existed with respect to its preparation, and the uncertainty of the market for the produce when so prepared. Objections, founded on the character of the crop, and the comparatively high prices of grain, have, no doubt, had some influence in preventing the cultivation of a plant which was considered to be highly exhaustive, and had not the advantage of a protective system. By a change in the commercial policy of Great Britain, both flax and corn crops are placed upon the same footing; and the agriculturist, under these circumstances, will doubtless devote himself to the production of any article that promises an adequate return for his labor and capital.

The opinion that flax is an exceedingly exhaustive crop, is one that has long been entertained by the agriculturist; and the clauses which, in many cases, are introduced into the agreements and leases of farming tenants in Great Britain, forbidding the culture of flax, hemp, and woad, have, no doubt, tended to strengthen this opinion. It is quite certain that flax, in itself, like all other crops, is an exhaustive one. The farmer does not refuse to grow wheat because it is exhaustive, as he knows that a great proportion of the crop is returned to the soil. There are two modes of testing the accuracy of opinion with respect to the inju-

rious effects of the flax crop—namely, by chemical analyses, and also by practical experience; the last of which is the most convincing to the grower.

Specimens of Woad.—E. Gilman, Twickenham.

This plant was once cultivated to a great extent for the blue dye extracted from it, but has been greatly superseded by indigo. It might still be cultivated to great advantage, as it improves the quality and color of indigo when mixed with it in a certain proportion. The plants, when just about flowering, are mown with a scythe, washed in water, and sun-dried; after this they are ground into a paste, which, kept in heaps for about a fortnight, is then formed and pressed into solid balls. It is also occasionally sown as food for cattle, and has lately been recommended for this purpose, under the name of "pastel." Its vigorous growth and hardy nature are in its favor; but it will only flourish in very rich soils.

MANURES.

Superphosphate of Lime and Bone Dust; prepared by A. Ramsey, 65 Mark Lane, London.

Manures for Corn, Hops, Turnips, and all other Crops; prepared by the Inorganic Manure Company, Bow, London.

Peruvian Guano, Saltpetre, Nitrate of Soda, Prepared Night Soil.

Every substance which has been used to improve the natural soil, or to restore to it the fertility which is diminished by the crops annually carried away, has been included in the name of manure. It is well known to all practical agriculturists that the texture of the soil, and the proportions of the earths of which it is composed, are the first and most important conditions of its productive powers. Where there is a good natural loam, which retains moisture without being overcharged with wet, and permits the influence of the atmosphere to pervade it, the crops cannot fail to be more certain and remunerating than in loose sand, or tenacious clays; but at the same time it is equally true, that the best texture of soil will not produce good crops for any length of time without the help of manure, to recruit the loss produced by vegetation.

The methods employed in the cultivation of land are different in every country; and when we inquire the cause of these differences, we receive the answer that they depend upon circumstances. No answer could show ignorance more plainly, since few have ever yet devoted themselves to ascertain what these circumstances are. Thus, also, when we inquire in what manner manure acts, we are answered that the excrements of men and animals are supposed to contain an incomprehensible something which assists in the nutrition of plants, and increases their size. This opinion is often embraced without even an attempt being made to discover the component parts of manure, or to become acquainted with its nature.

In addition to the general conditions, such as heat, light, moisture, and the component parts of the atmosphere, which are necessary for the growth of all plants, certain substances are found to exercise a peculiar

influence on the development of particular plants. These substances either are already contained in the soil, or are supplied to it in the form of substances known under the general name of manure. But what does the soil contain, and what are the components of the substances used as manure? Until these points are determined, a rational system of agriculture cannot exist. The power and knowledge of the physiologist, agriculturist, and chemist must be united for the complete solution of these questions.

The general object of agriculture is to produce, in the most advantageous manner, certain qualities, or a maximum size, in certain parts or organs of particular plants. Now this object can be attained only by the application of those substances which we know to be indispensable to the development of these parts or organs, or by supplying the conditions necessary to the production of the qualities desired.

The rules of a rational system of agriculture should enable us, therefore, to give to each plant that which it requires for the attainment of the object in view.

As the composition of soils forms an important feature in the profession of agriculture, it will be our duty to explain, as briefly as possible, some of those which have the most distinct characters from their connexions with different geological formations.

There are various modes of distinguishing soils without entering into a minute analysis of their component parts. The simplest and most natural is, to compare their texture, the size and form of the visible particles of which they are composed, and to trace the probable source of their original formation from the minerals which are found around or below them. The science of geology is of great utility in aiding us to compare different soils and ascertain their composition.

The soils which are immediately derived from those rocks, in which no traces of organic remains are to found, consist either of visible fragments of hard minerals, which are not affected by exposure to air or water, or of minuter particles of the same, of which the shape is not readily distinguished by the naked eye. When they are altogether composed of visible particles and stones, the water readily passes through them; and unless they are kept continually moist by a regular irrigation, without any stagnation of the water, they are absolutely incapable of sustaining vegetation.

It is seldom, however, that any gravel or sand does not contain some portion of earth or other matter, of which the particles become invisible when diffused through water, and to which we will here give the general name of impalpable substance. A certain portion of this finer part of the soil, and its due admixture with the coarser, especially where there is some regular gradation of size, and no stones of too large dimensions to obstruct the instruments of tillage, may be considered as essential to fertility.

The soils which have been formed from the disintegration and decomposition of the primitive rocks, such as granite, basalt, or limestone, and those which contain all these minerals minutely divided and intimately mixed, are always naturally fertile and soon enriched by cultivation. The hard particles of quartz maintain a certain porosity in the soil, which allows air and moisture to circulate, while the alumina prevents its too rapid evaporation. The silicate of potash is highly favorable to the vegetation

of those plants which contain silica in their stems; in fact silica is present in the ashes of nearly all plants, having entered the plants by means of alkalies.

The primitive limestone, which is very hard, is yet gradually decomposed by the action of air and water, being in a very small degree soluble in the latter. The water which flows through these rocks is soon saturated; but when it springs out and comes to the light, the carbonate of lime is deposited by the evaporation of the water; and if this meets with the clay which results from the decomposition of the slate, it forms a marl, which, naturally or artificially added to silicious sand, forms the basis of a very good soil, particularly well adapted to pasture.

The soils, which have evidently been formed from the rocks, which are supposed to be of secondary formation, are fertile according to the proportion of the earths of these rocks which they contain. It is of these chiefly that those loose, sandy soils are formed, of which the particles appear as distinct crystals, easily distinguishable with the aid of a lens, or even by the naked eye. Air and water have been the chief agents in the decomposition of those secondary rocks called sandstones, and agitation in water has washed from them the finer portions which have remained suspended. The immense sandy plains, which are for the most part barren, have probably once been the shores of the sea, from which the waves have washed all that portion which was impalpable and easily suspended in water, depositing this in the depths, which, by some convulsion in nature, may some time or other be raised above the level of the waters, and form hills or plains of clay.

Argillaceous earth exists, in some proportion, in almost every rock. Some of the hardest gems are chiefly composed of alumina. It has the property, when mixed with other substances, as silica or lime, of fusing into a stone of great hardness and insolubility. In this state, its effect on the soil is not to be distinguished from that of silica; and by burning common clay, or clay mixed with carbonate of lime, a sandy substance is produced, resembling burnt brick, which tends greatly to improve the texture of those clays which contain little or no sand in their composition. It must be remembered that the stiffest clays contain a large portion of silica in an impalpable state; but this, instead of correcting their impermeable and plastic nature, rather adds to it. It is only palpable sand, which, with clay, forms what is commonly called loam, and which, when the sand is in due proportion with a mixture of organic matter, forms the richest and most easily cultivated soils. Some of the rocks of secondary formation contain a considerable portion of alumina and lime; and when these earths meet with crystallized sand, a compound, or rather a mixture, is formed which has all the requisite qualities, as to texture, to produce the most fertile loams. The only deficiency is organic matter; but this is so readily accumulated wherever vegetation is established, or can be so easily added artificially, that these loams may be always looked upon as the most favorable soils for agricultural operations; and if a considerable depth of loam is found, which neither retains water too long nor allows it to percolate too rapidly, it may be looked upon as a soil eminently capable of the highest degree of cultivation. It is known that the aluminous minerals are the most widely diffused on the surface of the earth; and all fertile soils, or soils capable of culture, contain alumina as an invariable constituent. There must, therefore, be

something in aluminous earth which enables it to exercise an influence on the life of plants, and to assist in their development. The property on which this depends is that of its invariably containing potash and soda.

It will be seen that each distinct formation gives rise to a great variety of fertility, even where the basis remains the same; but it is of great importance to the farmer to ascertain the general nature of the rocks and strata on which his farm lies. In these soils which we have mentioned no notice has been taken of organic matter, because this does not seem in any way connected with their formation. The primary strata are distinguished by having no traces of organic remains in their composition. It is in the tertiary strata, especially those which have been formed by the destruction of animal and vegetable substances, that organic matter becomes a peculiar object of attention; and it is doubtless from this reason alone that the alluvial soils of later date are found so highly fertile. The alluvial soils formed by the deposit of a variety of earths in a state of great division, and mixed with a portion of organic matter, form by far the most productive lands. They will bear crop after crop with little or no addition of manure. These soils are found along the course of rivers which traverse extensive plains, and which have such a current as to keep very fine earth suspended by a gentle, yet constant, agitation, but not sufficiently rapid to carry along with it coarse gravel or sand. Wherever there is an obstruction to the current, and an eddy is formed, there the soil is deposited in the form of mud, and, gradually accumulating, forms those alluvial soils which are so remarkable for their fertility. In these soils the impalpable matter greatly predominates; but the intimate mixture of the earths with organic matter, in a state which has been called *humus*, prevents their consolidating into a stiff clay, and the gases which are continually evolved from the organic matter keep the pores open, and give scope to the growth and nourishment of the root.

Organic matter is no doubt essential to great fertility in a soil, but some soils require more of it than others. *Humus*, which is the form which organic matter naturally comes to by slow decomposition in the earth, gives out certain elements which the roots can take up in their nascent state, and from which they obtain the carbon so abundant in all vegetable productions. But organic matter, in every stage of its spontaneous decomposition, keeps the pores of the soil open, and admits, even if it does not attract, air and moisture to the fibres of the roots.

Professor Liebig, however, takes a different view of this subject. He says: "Land of the greatest fertility contains argillaceous earths, and other disintegrated minerals with chalk and sand, in such a proportion as to give free access to air and moisture. The land in the vicinity of Mount Vesuvius may be considered as the type of a fertile soil, and its fertility is greater or less in different parts, according to the proportion of clay or sand which it contains.

"The soil which is formed by the disintegration of lava cannot possibly, on account of its origin, contain the smallest trace of vegetable matter; and yet it is well known that when the volcanic ashes have been exposed for some time to the influence of air and moisture, a soil is gradually formed in which all kinds of plants grow with the greatest luxuriance."

This fertility is owing to the alkalies which are contained in the lava, and which, by exposure to the weather, are rendered capable of being absorbed by plants. Thousands of years have been necessary to convert stones and rocks into the soil of arable land, and thousands of years more will be required for their perfect reduction—that is, for the complete exhaustion of their alkalies.

Air, water, and the change of temperature, prepare the different species of rocks for yielding to plants the alkalies which they contain. A soil which has been exposed for centuries to all the influences which affect the disintegration of rocks, but from which the alkalies have not been removed, will be able to afford the means of nourishment to those vegetables which require alkalies for their growth during many years; but it must gradually become exhausted, unless those alkalies which have been removed are again replaced: a period, therefore, will arrive when it will be necessary to expose it from time to time to a further disintegration, in order to obtain a new supply of soluble alkalies; for, small as is the quantity of alkali which plants require, it is nevertheless quite indispensable for their perfect development.

The first colonists of Virginia found a country the soil of which was similar to that just mentioned; harvests of wheat and tobacco were obtained for a century from one and the same field without the aid of manure; but now whole districts are converted into unfruitful pasture land, which, without manure, produces neither wheat nor tobacco. From every acre of this land there were removed, in the space of one hundred years, 12,000 pounds of alkalies in leaves, grain, and straw. It became unfruitful, therefore, because it was deprived of every particle of alkali which had been reduced to a soluble state, and because that which was rendered soluble again in the space of one year was not sufficient to satisfy the demands of the plants. It is the greatest possible mistake to suppose that the temporary diminution of fertility in a soil is owing to the loss of *humus*; it is the mere consequence of the exhaustion of the alkalies.

Let us look at the condition of the country around Naples, which is famed for its fruitful corn land. The farms and villages are situated from eighteen to twenty-four miles distant from each other, and between them there are no roads, and consequently no transportation of manure. Now, grain has been cultivated on this land for thousands of years, without any part of that which is annually removed from the soil being artificially restored to it. How can any influence be ascribed to *humus* under such circumstances, when it is not even known whether *humus* was ever contained in the soil?

The method of culture in that district explains the permanent fertility. A field is cultivated once every three years, and is in the intervals allowed to serve as a sparing pasture for cattle. The soil experiences no change in the two years during which it lies fallow, further than that it is exposed to the influence of the weather, by which a fresh portion of the alkalies contained in it are again set free or rendered soluble. The animals fed on these fields yield nothing to these soils which they did not formerly possess. The weeds upon which they live spring from the soil, and that which they return to it as excrement must always be less than that which they extract. The fields, therefore, can have gained nothing from the mere feeding of cattle upon them; on the contrary, the soil must have lost some of its constituents.

Experience has shown, in agriculture, that wheat should not be cultivated after wheat on the same soil, for it belongs, with tobacco, to the plants which exhaust a soil. But if the humus of a soil gives it the power of producing grain, how happens it that wheat does not thrive in many parts of Brazil, where the soils are particularly rich in this substance?

The cause is, that the strength of the stalk is due to silicate of potash, and that the grain requires phosphate of magnesia, neither of which substances a soil of humus can afford, since it does not contain them. The plant may, indeed, under such circumstances, become an herb, but will not bear fruit.

Potash is not the only substance necessary for the existence of most plants; indeed the potash may be replaced in many cases by soda, lime, or magnesia. But other substances besides alkalies are required to sustain the life of plants. Phosphoric acid has been found in the ashes of all plants hitherto examined, and always in combination with alkalies or alkaline earths. Most seeds contain certain quantities of phosphates. In the seeds of different kinds of corn, particularly, there is abundance of phosphate of magnesia.

The soil in which plants grow furnishes them with phosphoric acid, and they in turn yield it to animals, to be used in the formation of their bones, and of those constituents of the brain which contain phosphorus. Much more phosphorus is thus afforded to the body than it requires when flesh, bread, fruit, and husks of grain are used for food; and this excess is eliminated in the urine and the solid excrements.

Although by artificial cultivation the quantity of humus in a soil may be increased almost to any degree, still, in spite of this, there cannot be the slightest doubt that a soil must gradually lose those of its constituents which are removed in the seeds, roots, and leaves of the plants raised upon it. The fertility of a soil cannot remain unimpaired, unless we replace in it all those substances of which it has been thus deprived. Now this can only be done by manure.

The manures thus used are divided in two classes—

1. Animal or natural manures.
2. Chemical or artificial manures.

Among the most important of the animal manures are the excrements of animals. The peculiar property of earth in absorbing putrid effluvia, and removing disagreeable smells, appears an indication of nature, to lead us to bury putrid animal substances, of which the excrements and dead carcasses of animals are the most numerous and obvious. It would require no length of experience to show that wherever this is done, vegetation is more vigorous. There is, therefore, another motive for burying manure than merely to get rid of a disagreeable substance. From the most ancient times, of which there are any records, the manuring of a field has been an important part of cultivation.

We may now inquire whether the excrements of animals are all of a like nature and power, and whether they in every case administer to the necessities of a plant by an identical mode of action. * These points may easily be determined by ascertaining the composition of the animal excrements, because we shall thus learn what substances a soil really receives by their means. According to the common view, the action of solid animal excrements depends on the decaying organic matters which

replace the humus, and on the presence of certain compounds of nitrogen, which are supposed to be assimilated by plants, and employed in the production of gluten and other azotized substances. But this view requires further confirmation with respect to the solid excrements of animals, for they contain so small a proportion of nitrogen, that they cannot, possibly, by means of it, exercise any influence upon vegetation.

We may form a tolerably correct idea of the chemical nature of the animal excrements, without further examination, by comparing the excrements of a dog with its food. When a dog is fed with flesh and bones, both of which consist in great part of organic substances containing nitrogen, a moist white excrement is produced, which crumbles gradually to a dry powder in the air. This excrement consists of the phosphate of lime of the bones, and contains scarcely $\frac{1}{100}$ part of its weight of foreign organic substances. The whole process of nutrition of an animal consists in the progressive extraction of all the nitrogen from the food, so that the quantity of this element found in the excrements must always be less than that contained in the nutriment.

When horse excrement is treated with water, a portion of it, to the amount of three or three and a half per cent., is dissolved, and the water is colored yellow. The solution is found to contain phosphate of magnesia and salts of soda, besides small quantities of organic matters. The portion of the excrement undissolved by the water yields to alcohol a resinous substance, possessing all the characters of gall, which has undergone some change; while the residue possesses the properties of sawdust, from which all soluble matter has been extracted by water and burns without any smell. One hundred parts of the fresh excrement of a horse, being dried at 212° F., leave from 25 to 31 parts of solid substances, and contain accordingly 69 to 75 parts of water. From the dried excrements, we obtain variable quantities of salt and earthy matters, according to the nature of the food which has been taken by the animal. It results, then, that with from 3,600 to 4,000 pounds of fresh horse manure, corresponding to 100 pounds of dry manure, we place on the land from 2,484 to 3,000 pounds of water, and from 730 to 800 pounds of vegetable matter, and also from 100 to 270 pounds of salt and other inorganic substances.

The latter are evidently the substances to which our attention should be directed, for they are the same which formed the component parts of the hay, straw, and oats with which the horse was fed. Their principal constituents are the phosphates of lime and magnesia, carbonate of lime, and silicate of potash; the first three of these preponderating in grains, the latter in hay. Thus, in 1,000 pounds of horse manure, we present to a field the inorganic substances contained in 6,000 pounds of hay, or 8,300 pounds of oats.

The peculiar action, then, of the solid excrements is limited to their inorganic constituents, which thus restore to a soil that which is removed in the form of roots or grain. When we treat land with the manure of the cow or sheep, we supply it with silicate of potash and some salts of phosphoric acid; and when enriched with the manure of the horse, we supply it with silicate of potash and phosphate of magnesia. In the straw which has served for a litter, we add a further quantity of silicate of potash and phosphates; which, if the straw be putrified, are in exactly the same condition in which they were before being assimilated.

It is evident, therefore, that the soil of a field will alter but little if we collect and distribute the manure carefully. A certain portion of the phosphate, however, must be lost every year, being removed from the land with the grain and cattle; and this portion will accumulate in the neighborhood of large towns. The loss thus suffered must be compensated for in a well managed farm; and this is partly done by allowing the fields to lie in grass. It is considered that, for every 100 acres of corn land, there should be 20 acres of pasture land, which produce annually, on an average, 5,000 pounds of hay. Then, assuming that the ashes of the excrements of the animals fed with this hay amount to nearly seven per cent., 341 pounds of the silicate of lime, and phosphates of magnesia and lime, must be yielded by these excrements, and will, in a certain degree, compensate for the loss which the land had sustained.

We could keep our fields in a constant state of fertility by replacing every year as much as we remove from them in the form of produce; but an increase of fertility, and consequent increase of crop, can only be obtained when we add more to them than we take away. It will be found that, of two fields placed under conditions otherwise similar, the one will be most fruitful upon which the plants are enabled to appropriate more easily, and in greater abundance, those contents of the soil which are essential to their growth and development.

It will now be easily understood that, for animal excrements, other substances containing their essential constituents may be substituted. In Flanders, the yearly loss of the necessary richness in the soil is completely restored by covering the fields with ashes of wood or bones, which may or may not have been lixiviated, and of which the greatest part consists of the phosphates of lime and magnesia. The great importance of manuring with ashes has been long known by agriculturists. Now, bone manure possesses a still greater importance in this respect. The primary sources from which the bones of animals are derived are hay, straw, or other substances used as food. If we admit that bones contain 55 per cent. of the phosphates of lime and magnesia, and that hay contains as much of them as wheat straw, it will follow that eight pounds of bones contain as much phosphate of lime as 1,000 pounds of hay or wheat straw, and two pounds of it as much as 1,000 pounds of the grain of wheat or oats. These numbers express pretty nearly the quantity of phosphates which a soil yields annually on the growth of hay and corn. Now, the manure of an acre of land with 40 pounds of bone dust is sufficient to supply three crops of wheat, clover, turnips, &c., with phosphates. But the form in which they are restored to a soil does not appear to be a matter of indifference; for, the more finely the bones are reduced to powder, and the more intimately they are mixed with the soil, the more easily are they assimilated.

Experiments on bones, as a manure, were made long before their use was extensively adopted, and these, in general, were not attended with a very favorable result, in consequence of the bones not being broken into sufficiently small pieces, or being put upon the land in too fresh a state; but since the proper use of them has been ascertained, the advantage of this article as a manure, in distant and uncultivated spots, where the carriage of common stable-manure would have been too expensive, and where it could not be made for want of food or cattle, is incalculable. By means of bones large tracts of barren heaths and sands in Great

Britain have been converted into fertile fields. The bones are broken into different sizes, and are accordingly called inch bones, half-inch bones, and dust. Most of the bones used in England—which are procured from the large manufacturing towns—have undergone the process of boiling, by which the oil, and a great part of the gelatine which they contain, have been extracted. At first sight we should be led to imagine that, having lost much of the rich animal matter which they contained, they would be proportionably less effective in the soil. This, however, seems not to be the case, as experience has shown that, while little difference can be observed, many give the preference to those from which the oil and glue have been extracted; in fact, from late experience it has been found that bones act more speedily and efficaciously after being boiled. But oil and glue form excellent manures. This is explained by the fact that bones do not furnish much nourishment to the roots of plants until they have undergone a certain degree of decomposition; the fat and the gelatine, being intimately blended with the bony matter, and contained in cavities or cells, may remain a long time in the earth without decomposition. As a proof of this, it has been found that bones which had lain in the earth for many centuries, on spots where ancient battles had been fought, afforded, on analysis, nearly as much gelatinous matter, by the abstraction of the earthy parts, as fresh bones would have done. It would seem, therefore, that the great effect of bones, as a manure, must depend on the phosphate of lime, and the effect of bone ashes seems to strengthen this opinion. A close examination of the fields manured with bones has led to a surmise that much of their importance depends upon the mechanical texture of the bone, and on its power of absorbing and retaining moisture; for if a plant which vegetates with peculiar vigor in a field manured with bones be pulled up, it will be almost invariably found that small pieces of bones are attached to the roots; and when these are minutely examined, the smaller fibres of the roots will be found to have grasped them and to pervade their cavities, always more or less moist. The moisture, then, and a small portion of the remaining gelatine dissolved in it form the food on which the plant has thriven. The more the bones have undergone fermentation, the more soluble the gelatine will be. In its fresh state it is only soluble in very warm water, and the oil repels moisture. This accounts for the seeming anomaly of the superiority of boiled bones, since by this process they have undergone a fermentation; the residue, although not deprived of all its animal matter, is much more porous, and will imbibe and retain moisture. The food of the plants is here ready prepared and dissolved, and kept in store without being in danger of being washed through a porous soil, or being evaporated by the heat. The solid substance, which is chiefly phosphate of lime, has a stimulating effect, and assists that of the more soluble parts; but phosphate of lime is not soluble in water, and does not decompose readily in the earth, and it therefore acts slowly upon the roots of crops, to which it is applied as a manure. Dr. Liebig's great discovery—that oil of vitriol, (sulphuric acid,) if mixed with bones, would take to itself a part of this lime, leaving behind a new salt containing at least a double portion of phosphorus, and therefore called super-phosphate of lime—was founded upon correct analysis. This salt, being readily dissolved by water, he hoped would afford a more digestible food for root crops; and the result has answered his expectations.

Hitherto this mixture has been applied as a liquid manure, diffused sometimes in fifty times its bulk in water. This process, however, was found too tedious and expensive.

The methods now adopted by artificial manure-makers in England, and by large farmers, are as follows—premising, however, that coarse bone-dust is preferred, and the ingredients are mixed in a brick tank in the ground, some eight feet long by four feet wide, with a depth of from eighteen to twenty-four inches, the rakes and shovels employed being of copper: to any quantity of bone (not more than fifteen hundred weight should be mixed at a time) put into this tank, half its weight in oil of vitriol should be gradually added. This will soon begin to heat, seething violently, and sending out a great deal of steam, with a peculiarly offensive stench; presently the whole mixture will wear the appearance of a boiling mass and swell greatly from the escape of gas. This mixture, from the time of the pouring in of the vitriol, should be continually raked about, so that every particle of the bone may be dissolved by the acid. Great attention should be paid to this. In a short time the bones will disappear altogether; and when it has been raked until it gets so thick that it can be worked no longer, it should be shovelled out on to the ground, where, in the course of a day or two, it will become quite dry, and may then be broken up into powder and put on the land. It will be found necessary, if the bone is dry when put into the tank, to add seven or eight pailfuls of water, and mix with the bone, before pouring in the acid. In England super-phosphate of lime is used to a very great extent as a manure for turnips, and scarcely any other manure could produce such results. The best mode of applying it is to sow it broadcast, at the rate of from four to five hundred weight per acre, harrowing it in, that it may not come in contact with the seed.

Night Soil.—In respect to the quantity of nitrogen contained in excrements, 100 parts of the urine of a healthy man are equal to 1,300 parts of the fresh manure of a horse, and to 600 parts of that of a cow. Hence, it is evident that it would be of much importance to agriculture if none of the human urine were lost. Its disagreeable odor; its erroneous modes of application, either in such excessive quantities, or mixed with other composts in such proportions that its powers could not be distinguished in the mass; its semi-fluid nature, requiring for its removal carriages of a peculiar construction; and several other minor obstacles, have rendered its use infrequent in most countries.

The powerful effects of urine as a manure are well known in Flanders, and they are considered invaluable by the Chinese, who are the oldest agricultural people. Davis, in his history of China, states that every substance convertible into manure is diligently husbanded. The cakes that remain after the expression of their vegetable oils, horns and hoofs reduced to powder, together with soot and ashes, and the contents of common sewers, are much used. The plaster of old kitchens, which in China have no chimneys but an opening at the top, is much valued, so that they will sometimes put a new plaster on a kitchen for the sake of the old. All sorts of hair are used as a manure, and barbers' shavings are carefully appropriated to that purpose. The annual produce must be considerable in a country where some hundred millions of heads are kept constantly shaved. Manure of all animals, but more especially night soil, is esteemed above all others. Being sometimes formed into

cakes, it is dried in the sun, and in this state becomes an object of sale to farmers, who dilute it previous to use. They construct large cisterns, or pits, lined with lime plaster, as well as earthen tubs, sunk into the ground, with straw over them to prevent evaporation, in which all kinds of vegetable and animal refuse are collected. These, being diluted with a sufficient quantity of liquid are left to undergo the putrefactive fermentation, and then applied to the land. In the case of everything except rice the Chinese seem to manure the plant itself rather than the soil, supplying it copiously with their liquid preparation.

The Chinese husbandman always steeps the seeds he intends to sow in liquid manure until they swell, and germination begins to appear, which experience has taught him will have the effect of hastening the growth of the plants, as well as of defending them against the insects hidden in the ground in which the seeds are sown. To the roots of plants and fruit trees liquid manure is also applied. The business of collecting urine and night soil employs an immense number of persons, who deposit tubs in every house in the cities for the reception of the urine of the inmates, which vessels are removed daily with as much care as our farmers remove their honey from the hives. Indeed, so much value is attached to the influence of human excrements by these people that the laws of the State forbid that any of them should be thrown away; and no other manure is used for their corn fields.

China is the birthplace of the experimental arts. The incessant striving after experiments conducted the Chinese a thousand years since to discoveries which have been the envy and admiration of all nations for centuries, especially in regard to painting and dyeing, and to the manufactures of porcelain, silk, and colors for painters. These we were long unable to imitate; and yet they were discovered by them without the assistance of scientific principles; for in the books of the Chinese we find recipes and directions for use, but never explanations of processes.

Half a century sufficed to Europeans not only to equal, but to surpass, the Chinese in the arts and manufactures; and this was owing merely to the application of correct principles deduced from the study of chemistry. But how infinitely inferior is the agriculture of Europe to that of China! The Chinese are the most admirable gardeners and trainers of plants, for each of which they understand how to prepare and apply the best-adapted manure. The agriculture of their country is the most perfect in the world, and yet very little value is attached to the excrements of animals.

If we admit that the liquid and solid excrements of man amount, on an average, to one and a half pound daily, and that they contain three per cent. of nitrogen, then in one year they will amount to 547 pounds, which will contain nearly 17 pounds of nitrogen—a quantity sufficient to yield the nitrogen of 800 pounds of wheat, rye, oats, or of 900 pounds of barley.

This is much more than it is necessary to add to an acre of land in order to obtain, with the assistance of the nitrogen absorbed from the atmosphere, the richest possible crop every year. Every town and farm might thus supply itself with the manure, which, besides containing the most nitrogen, contains also the most phosphates; and if rotation of the crops were adopted they would be most abundant. By using at the

same time bones and the lixiviated ashes of wood, the excrements of animals might be entirely dispensed with. Except another powerful manure, produced by the herring-oil-works' refuse, none can come into competition for richness with the contents of the privy mixed with urine. The effects of this manure no doubt diminish gradually, yet its operation may be plainly perceived in the fourth successive crop. When human excrements are treated in a proper manner, so as to remove the moisture which they contain without permitting the escape of the ammonia, they may be put in such a form as will allow them to be transported even to great distances. This is already attempted in many towns in England; and the preparation of night soil for transportation constitutes not an unimportant branch of industry. But the manner in which this is done is very injudicious.

The excrements are preserved in the houses in open casks, from which they are collected and placed in deep pits, but are not sold until they have attained a certain degree of dryness, by evaporation in the air. But whilst lying in the receptacles appropriated for them in the houses, the greatest part of their area is converted into carbonate of ammonia; lactate and phosphate of ammonia are also formed, and the vegetable matters in them putrify; all their sulphates are decomposed, whilst their sulphur forms sulphuretted hydrogen and hydro-sulphate of ammonia. The mass, when exposed to the air and dried, has lost more than half of the nitrogen which the excrements originally contained; for the ammonia escapes into the atmosphere along with the water which evaporates; and the residue now consists principally of phosphate of lime, with phosphate and lactate of ammonia, and small quantities of urate of magnesia and fatty matter. Nevertheless, it is still a very powerful manure; but its value, as such, would be twice as great if the excrements, before being dried, were neutralized with a cheap mineral acid.

In other manure manufactories, the night soil, while still soft, is mixed with the ashes of wood, or with earth, both of which substances contain a large quantity of caustic lime, by means of which a complete expulsion of all its ammonia is effected, and it is completely deprived of smell. But such a residue, applied as manure, can act only by the phosphates which it still contains; for all the ammoniacal salts have been decomposed, and their ammonia expelled.

A patent has been taken by a manufacturer in London for the preparation of this useful manure, which states, in its specification, that the night soil is to be mixed with calcined mud and finely-divided charcoal. By this means the smell is completely and instantaneously removed, and the ammonia retained by virtue of the affinity which alumina and charcoal exert for that compound. This plan is both simple and efficacious, but the ammonia is apt to be expelled by the application of the heat employed in drying the manure. The addition of a cheap mineral acid to the night soil, before admixture with these ingredients, would materially improve the process. Perhaps the best and most practical method of fixing the ammoniacal salts of urine and night soil is to mix them with the ashes of peat or coal. When the latter are employed, care must be taken to select such as are of a porous, earthy consistence. The ashes, both of peat and coal, contain, in general, magnesia; hence their value as an ingredient of prepared night soil. The night soil should be mixed thoroughly with the ashes, and exposed to the air to dry. The disa-

greeable smell is thus quickly removed, and a pulverulent manure obtained, which can be applied to the fields with facility.

Guano.—That the sea, in a variety of shapes, is the great receiver of the riches of the soil, has been long remarked by the natural philosopher. The considerable value and extent of the various organic matters which have been in all ages incessantly washing from the land through a multitude of streams into the ocean, is in fact an observation of remote antiquity. The finely-divided vegetable and animal substances poured down by the flood-waters of the Nile, and other Eastern rivers—the extensive and fertile deltas, which the deposit of these matters formed at their mouths—spoke a language that even the indolent Oriental cultivators could not but understand; and they not only perceived the value of the riches thus washing from the upland soil, but they soon began to strive, in many directions, to intercept them as they glided towards the ocean. But these partial attempts to intercept the organic substances floating down every streamlet towards the ocean, the farmer will perceive, can only be partial in their nature, and comparatively trifling in their results. Great masses of these matters are, in truth, still, as they have been from time immemorial, carried in the river waters to the sea, where, becoming either the food for fishes and insects, or deposited in its depths, they become lost to the soil, which their departure has impoverished. It is true that the agriculturist has long endeavored to recover from the ocean, in other forms, a portion of these matters; that he carries off collections of sea-weed, and buys up all the fishes that he can profitably procure, to enrich his land; and that mankind in all directions are doing the same, when they are seeking for and using fish as an article of food. But when all these supplies are taken into account, how small a proportion do the organic matters thus recovered from the sea bear to the great streams every hour pouring into it through an endless number of mouths?

Of such attempts, perhaps, one of the most extensive, as well as the most promising, of all modern efforts, is the introduction into agriculture of the Peruvian guano; for this is in truth a return to the land, in a very concentrated form, of a portion of the phosphate of lime, and other salts, which, washed from it by the drainage of waters, became the food, and entered into the composition, of the fish, the insects, and the weeds of the ocean. These, becoming in their turn the food of birds, are, in the undigested excremental matters of multitudes of sea-fowl, deposited on the rocky islands of the Pacific ocean, constituting a chief portion of the guano of the Peruvian farmers.

The date of the discovery of guano, and its introduction as a manure, is unknown, although no doubt exists as to its great antiquity; for it has been used as a manure by the Peruvians since the twelfth century, and its value was considered so inestimable, that the government of Incas issued a decree by which capital punishment was inflicted upon any person found destroying the fowl of the guano islands. Overseers were also appointed over each province, for the purpose of insuring them further protection. Under this state of things, the accumulation of the excrements may have well taken place. All those regulations are, however, now abandoned. The composition of guano points out how admirably fitted it is for manure; for not only does it contain ammoniacal salts in abundance, but also those inorganic constituents which are indispensable

for the development of plants. Guano, to be good, being in some measure soluble in water, can never be found in its most powerful state in any climate where rain falls; and consequently any that may be brought from the coast of Peru, taken from without the limits of dryness, must be of inferior value, compared with that which comes from the Chincha islands, situated in about $10\frac{1}{2}$ degrees south latitude, and about 10 miles distant from the main. The soil to which it is applied in South America, principally for the growth of maize, is of a sandy, sterile nature, containing but little organic matter. The plant is manured three times: the first in small quantity, at the time of sowing the seed; a larger application when the plant is less than half grown; and the third just previous to the commencement of ripening the seed. After each application the land is irrigated.

Experiments have been made, the results of which showed that three hundred weight of good Peruvian guano were equal to 20 tons of good farm-yard dung. But the question may arise whether guano and other stimulating manures do not exhaust the land while they produce great immediate results? This has been the result in California, and though such deterioration of the soil is comparatively of little consequence where there is abundance of wild land, yet it becomes a matter of great importance in all countries where cultivation has been carried on for a length of time.

Guano is now so extensively adulterated, that it is next to impossible for the farmer to obtain it in a pure state; and instances have occurred in which the adulterated matter prevailed to the extent of ninety-seven per cent. Umber-stone, ground into a fine powder, various earths, old mortar, and partially decomposed saw-dust, are employed for this purpose. The mixture is moistened with putrid urine, and redried. Even genuine guano differs so frequently in quality, that it is never advisable to purchase it without a satisfactory analysis.

In the application of guano, care should be taken to prevent its coming in contact with the seed. The guano should be mixed with three times its bulk of finely pulverized earth, burnt clay, ashes, &c. It is important that rain should follow the application of guano within a short time, and a wet season is generally considered most favorable to its success.

Artificial guano may be made by an admixture of the constituents of natural guano. The following is a good receipt:

	Pounds.
Bones, dissolved in spirits of salt, instead of oil of vitriol -	$18\frac{3}{4}$
Charcoal powder - - - - -	$18\frac{3}{4}$
Sulphate of ammonia (gas salt) - - - - -	$9\frac{1}{2}$
Common salt - - - - -	$9\frac{1}{2}$
Gypsum - - - - -	$9\frac{1}{2}$
Wood-ashes - - - - -	46
Nitrate of soda - - - - -	28
Sulphate of soda (Glauber salts) - - - - -	10
Sulphate of magnesia (Epsom salts) - - - - -	10
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These ingredients, well incorporated together, and applied at the rate of five hundred weight per acre, have been successfully used as a substitute for Peruvian guano.

Composts.—The increase of manure by the formation of composts is now generally understood in England, and by their means the land has in many districts been rendered much more productive. The fundamental principle upon which composts have been made, is that of impregnating portions of earth with those of the excrement of cattle, which from want of management in the common dunghills, would have been dissipated and lost; and also accelerating or retarding the decomposition of animal and vegetable substances by the addition of earths—such as chalk, marl, clay, and even sand; according to the nature of the soil on which the compost is to be used. All solid manure which is to be ploughed into the ground should contain certain parts already soluble in water, which promote vegetation; while other portions should be in a progressive state, so as to afford a succession of soluble matter by a gradual and slow decomposition. Sir H. Davy, who so much enlarged the sphere of chemical science by his discoveries, hastily asserted that the manure from the stables and yards should be buried in the soil as soon as possible, because when it is collected in a dung-hill a great portion of volatile and gaseous matter escapes into the atmosphere. But he did not then proceed to show whether the ammonia or hydrogen which escapes would have been of any use in the soil. It does not appear that fermenting manure produces carbonic acid; for a man may sleep upon it without much danger, which would not be the case if much carbonic acid were evolved. The ammonia is produced in the very first stage of decomposition, as may be perceived in opening the door of a stable where horses have been shut up for some time; but a heap of manure does not produce the same effect when its first heat is gone off. Most observant practical farmers have followed a contrary practice, and let their manure be tolerably short and rotten before it is ploughed into the soil. In Flanders they pour liquid manure on the small heaps of dung in the field to excite fermentation, before they spread it and plough it in; some, on the other hand, let the manure spread over the soil; rolling it, in order to pulverize it some time before it is ploughed in.

In the formation of composts, the principal objects are to regulate the decomposition of the organic substances, and to increase the bulk of the manure by means of less expensive materials than straw. For these purposes, lime or chalk is generally used; the former in its caustic state, to accelerate the decomposition of fibrous matter; the latter to add to the mass, and absorb any portion of acid, which is always produced in a certain stage of the fermentation. The stiffest clay may be used with advantage in composts, where better soil is not at hand; and for light lands the stiffer the clay the better, provided it be thoroughly incorporated with the manure. The most useful material, under proper management, is peat or turf. This may be laid in layers with quick lime and earth; the whole being well soaked with liquid manure. If any kind of vegetable matter, such as fern, broom, weeds, &c., can be added, it will be so much the richer. The lime and urine, acting on the peaty matter, decompose its tannin, and transform it into humus; the woody fibre is dissolved, and the whole mass, when turned over, and well mixed, becomes a very rich earth, which being spread on the land, and slightly ploughed or harrowed in, greatly enriches its surface. By this means, many poor soils may be improved, where the cultivation is not sufficiently extended to produce straw. As a substitute for urine,

several mixtures of animal and saline matters have been tried, which are supposed to resemble it in composition. There is no reason why such a liquid might not be formed artificially; and if it can be made with cheap materials, which may be obtained in abundance, and at a less expense than by keeping cattle, it would be of great importance to the farmer.

Peat Charcoal.—Within the last few months, a society has been formed in Great Britain, called “The Irish Amelioration Society,” having for its purpose the manufacturing peat fuel and charcoal out of the peat bogs of Ireland—thus converting large tracts of land, previously worthless, to a state of great fertility. Its action on vegetation is stated to be as follows:

Peat charcoal, placed in the soil in autumn, becomes a most valuable manure in spring. During winter the rain fills it with ammonia, phosphates, &c., which are yielded to the plant when nature demands sustenance. The action of charcoal, in absorbing from the atmosphere the gases essential to vegetable life, is unceasing.

Peat charcoal is therefore a vehicle to collect and hold the nutriment of plants, which is usually at large in the soil and atmosphere, and which every gleam of sunshine now draws from the soil. Again, it absorbs above 80 per cent. of water. If rain continue until it can bear no more water, it commences to act as a grain of sand, and aids filtration. When the soil subsequently becomes drier than itself, it then, and not before, yields its moisture to the soil or plant. Thus it is usually a reservoir of water, ready to irrigate, if required, its immediate locality. Assume that each grain be filled with water to the extent it will absorb, and that rain still falls, so strong is the affinity, that it will absorb the gases and reject the water. This can be readily proved by the following experiment:

“Take a quantity of sewage water, containing the average of gaseous components, and place it in a glass vase, and put as many lumps of properly made peat charcoal into the vase as it will hold. Although the pores of the charcoal will almost immediately become filled with water, without any change taking place in the general appearance, after a time (proportioned to the quantity) the charcoal will absorb the impurities of the water, and leave it transparent, although originally opaque.”

Other advantages arise in addition: whilst ammonia, phosphates, &c., are yielded to the root of the plant by the process described, so is carbon, in the shape of carbonic acid. Experience has led to this conclusion, from the fact that plants which contain carbon in abundance appear to be specially benefited by the use of charcoal. When placed in the soil, the action of the atmosphere and the soil combined produces combustion, aided or retarded by the greater or lesser amount of oxygen present. Carbonic acid is thus produced and evolved in contiguity to the root of the plant, and assimilated by it in the same manner as the ammoniacal and other gases, each of which, although known to be inhaled by the leaf, practice has shown is more beneficial to the plant when given to the root. Why, then, should one gas be withheld and another given? All chemists of note now agree that ammonia and sulphuretted hydrogen, &c., will be absorbed by the root. Why not, therefore, carbon? In fact it cannot longer be questioned. The most eminent chemists in the world—the French, led by Dumas, Boussingault, Cayen, &c.—now admit this fact, although it had previously been laid down as

a rule, that "all plants derive from the atmosphere the carbon they contain." There cannot have been a greater fallacy. The well-known value of farm-yard manure proves this point. The manure of animals alone never produces the same effect as when mixed with straw; hence practice established that admixture, which has continued for centuries. The action of the acids of the animal excrement on the straw, which is one of the essential components of farm-yard manure, produces fermentation. All who see a heap of manure understand this fact: that fermentation produces a slow combustion of the straw, converting it into *charcoal*, and thus carbon is continually obtained; and whilst being thus produced, it draws to itself (as its vital powers come into existence) the ammoniacal and other gases surrounding it, and holds them for the future nurture of the plant. Every straw used in the bed of farm-yard cattle contains 40 to 50 per cent. of carbon. That carbon is essential to vegetation, cannot now be questioned; hence the value, primarily, of peat charcoal. It contains, when perfectly made, about 80 per cent. of the purest carbon—more than the per-centage of the richest animal or bone charcoal. It immediately acts—absorbs all the components of the atmosphere essential to vegetation, holds them, and subsequently gives forth its own properties, which are equally valuable. If used by itself, it is well to impregnate it with water before being sown with the seed, which should be intimately intermixed. Whether rain follow or not, the seed will not be injured; if it do not, the seed must be served, for the moisture will aid in its germination; and in turnips especially the growth will have so far advanced before the fly, that the latter will be incapable of injury to the plant.

The quantity of charcoal per acre need not exceed a ton; in many instances it may be less. But if properly mixed with excretory matter or urine, from half that quantity to even one quarter will be sufficient.

Dr. A. Bachner, writing in the "*Garten Zeitung*," makes a very clear, scientific statement of the manner in which he supposes the charcoal to produce its beneficial results. The following is the most important part of his statement:

1. "*Absorption of Light and generation of Heat*.—It is well known that bodies receive the light of the sun the more perfectly the darker and looser they are, and that the consequent development of heat is in proportion to this absorption of light; hence, a black, light soil is, under the same circumstances and relations, much more favorable to vegetation than a light colored grey earth. Heavy, clayey soil, with a deficiency of humus, is less suitable to vegetation, inasmuch as it soon loses its porosity through rain and snow, and assumes a smooth surface, by which it is prevented from absorbing air and light, and generating heat; hence, agriculturists justly name these clayey soils, which are deficient in humus, cold soils. As charcoal dust is one of the darkest, dullest, and most porous of bodies, it must, on account of its peculiar capacity of receiving the sun's light, and changing it into heat, be particularly favorable to vegetable life.

2. "*Absorption of Atmospherical Air*.—Among all the porous bodies that have the capacity of absorbing gases and vapors, charcoal has been proved, by numerous experiments, to hold the first rank. If, therefore, clayey soil, deficient in humus, is in general less suitable to the growth of plants than rich, loose garden mould, the reason lies not only in the

latter receiving more light and creating warmth, but also in its more readily condensing, by its greater porosity, the constituent parts of the atmospheric air, and consequently supplying oxygen, nitrogen, and carbonic acid gas, for the nourishment of the spongioles. We come now to a very important point—the nourishment of plants—which cannot be slightly passed over in elucidating the theory of the effects of charcoal in this respect. Modern vegetable physiologists are, for the most part, of opinion that plants can receive no solid nourishment from the earth—that is, that everything that they can assimilate must be in a liquid and gaseous, or vapory state. If we, therefore, meet with silica, chalk, magnesia—in short, such substances in plants as could only be received from the soil, we may always consider it certain that these sorts of matter can only be absorbed by the roots in proportion as they are in a fluid or dissolved state in the soil. These sorts of matter, and particularly the different organic salts which we find in the ashes of vegetables, are not actually to be considered sources of nourishment, but stimulants to assist in digesting—as salt and spice are to the higher animals and man. We also not unfrequently observe that a superfluity or mixture of certain inorganic substances in the soil, prejudicial to certain families and species of plants, is the cause of disease, when this inorganized matter is in a dissolved state, and capable of being absorbed by them. If we analyze the nourishment of plants, we shall find that it is only the constituent part of air, water, and charcoal. The experiments of Boussingault on the origin of nitrogen in organic bodies show, first, that no plant exists without a proportion of nitrogen; and secondly, that while men and animals receive the portion of nitrogen of their bodies not from the air by breathing, but from food by assimilation, plants, on the contrary, draw their supply of nitrogen not from manure or humus, but from the air. We now come to a very important point in the nourishment of plants, to which M. Payen has particularly called our attention, viz: that charcoal operates as a condenser, under the influence of water, on the constituent parts of the air in the same manner as spongy platina on the elements of detonating gas—so that nitrogen and oxygen are dissolved, and, mixing with water, are absorbed by the spongioles. This property of condensing the air and making it fit to be received by plants, does not exclusively belong to charcoal, for it is also more or less perceptible in other sorts of earth; chiefly in porous or pulverized bodies. We know that water, even when not disturbed, through charcoal or earth, absorbs some air, which becomes a watery fluid, and by heating is again expelled in the form of gas; but charcoal powder appears to possess this power in the highest degree; consequently, besides light and heat, is capable of carrying to the roots both air and water, namely: nitrogen, hydrogen, and oxygen, in the greatest abundance.

“3. Decomposition of the charcoal, and formation of a nourishing substance for plants.

“It is well known that manure, as such, does not nourish plants, and that, on the contrary, when it touches the root it causes disease. We know that it is the matter produced by decay which affords the nourishment to plants. This apparently takes place because the humus, with the co-operation of air and water, is continually forming oxide of charcoal, or carbonate and nitrogen, which, together with the saline particles, is absorbed and assimilated by the roots. For a long time it was

generally believed that charcoal, as an inanimate body, incapable of decay, contributed in no degree to the nourishment of plants, and that charcoal dust could only serve, at most, to make the earth looser and warmer. But it has been ascertained by experiments that the charcoal in which plants grow by degrees undergoes decomposition, and at last becomes a sort of humus. This obviously takes place merely because the charcoal dust acts as humus, and, with the co-operation of water and air, continually gives out to the plants oxide of charcoal, or carbonate, together with the saline particles which are in the charcoal, and remain in the ashes after burning.

“4. Antiseptic power of charcoal.

“In judging of the effects of charcoal on vegetation, its antiseptic properties are of great importance, for it has very little power of retaining water, and the little it retains is partly absorbed by the roots, and partly evaporated. This property deserves the greatest attention of gardeners in respect to recovering the health of plants the roots of which have become injured by being in a clayey soil, and too frequently watered, or after continued rain, or being in contact with manure not sufficiently decomposed. They should be immediately transplanted into charcoal powder, as the most effectual method of cure.”

Liebig, though not offering any lengthened explanation, but speaking as if the point were more a matter of long established notoriety than of recent experiment and theory, gives his powerful testimony in the same direction as Buchner, and says: “Charcoal, in a state of powder, must be considered as a very powerful means of promoting the growth of plants on heavy soils, and particularly on such as consist of argillaceous earth.” “The free access of the carbonic acid gas of the atmosphere to the plants promotes their growth, increases their vigor, and enriches their secretions. The application of the same gas to their roots, although it has not been examined with the same care as its action upon their leaves, is yet evidently attended with the highest advantage. Thus the gas is one of the constant products of putrefaction. Wherever this is going on—as over stagnant drains, dung heaps, and other putrefying matters—there vegetation is sure to be rankly luxuriant; and that, too, in situations where the roots of the plants are far removed from immediate contact with the decomposing organic matters. This may be easily shown by the repetition of a very simple experiment which was first made by Sir H. Davy. This great chemist filled a glass retort, capable of containing three pints, with the hot fermenting dung and litter of cattle, and examined the elastic fluids which were generated. In thirty-five cubic inches, which were thus produced in three days, he found twenty-one of carbonic acid gas, the remainder being chiefly nitrogen; and after thus ascertaining the composition of these gases, he introduced the beak of another retort, filled in a similar manner, in the soil, under the roots of some grass growing in the border of a garden. In less than a week a very remarkable effect was produced on the grass exposed to the action of these gaseous matters of putrefaction; their color became deeper, and their growth was much more luxuriant than the grass in any other part of the garden. And hence, too, is derived one of the chief advantages of applying organic matters to the soil, and that in as immediate contact with the soil as possible, just as is effected when manures are added to the soil by the drill; for the roots or leaves of the plants are, by the

adoption of this plan, immediately in contact with the evolved carbonic acid, and other gases of putrefaction. They are thus readily absorbed as they are generated, and nothing is lost by escaping in the atmosphere; the gas, in fact, is instantly, yet gradually, transmuted from the putrefying products of the farm yard into the flour of the wheat. Owing to its peculiarly porous texture, charcoal possesses the property of absorbing a large quantity of air, or other gases, at common temperatures, and of yielding the greater part of them when heated."

M. F. Towers thus speaks of charcoal and carbonized substances: "To whatever quality may be ascribed the fertilizing powers of wood charcoal, certain it is that when newly made it absorbs given quantities of gases."

By the experiments of M. Laussure, it was proved that after charcoal was again heated to a red heat, then suffered to cool under mercury, and instantly plunged in a vessel of the gas, on being taken from the mercury it absorbed, (assuming 1 to represent a single volume of charcoal,)

Of ammoniacal gas	-	-	-	-	90
Muriatic gas	-	-	-	-	85
Carbonic acid gas	-	-	-	-	35
Oxygen gas	-	-	-	-	9.25
Hydrogen	-	-	-	-	1.75

It is stated, also, that if wood charcoal remains in contact with valerian, galbanum, balsam of Peru, or musk, it destroys their peculiar odor.

This absorbent power appears to depend upon the great porosity of charcoal, which itself is produced by the action of heat. Wood is composed chiefly of the elements of carbon, oxygen, hydrogen, with some salts of potassa and lime. When acted upon in iron cylinders, oxygen and hydrogen are expelled, and water is formed; also, some carbonaceous compounds, amongst which are pyroligneous acetic acid, pyroxilic spirit, and tar. The remaining charcoal retains the exact form of the wood employed. It is, however, lighter than water, and full of pores. When thus completely decomposed, it consists chiefly of carbon, with a little silica, and the bases of the salts above alluded to. Many years ago, a process was discovered by which the carbonate of soda, (*Sesqui carbonate*), then just coming into practical use, might be much improved. Crystals of the purest soda were exposed, on flat shallow trays, having canvas bottoms, to the vapor of ignited charcoal, and conveyed into close leaden vessels through a leaden cylinder. The combustion was effected in iron crucibles regulated by an air-stopper. The gas developed was pure carbonic acid. It acted upon the crystals of soda, combined with the neutral salt, and displaced the water of crystallization which drained through the canvas. In the fire crucible the residue of the combustion was very small in bulk and weight, and consisted of silex, lime, and potassa, which constitute the impurities of common charcoal. From these and corresponding data, we infer that wood charcoal is very inferior to the carbonized matter of peat, containing vegetable matters, either in respect to depurating, deodorizing, or fertilizing properties.

“Not only does it,” to use the language of Liebig, “surpass all other substances in the power which it possesses in condensing ammonia within its pores, but it is at the same time the most unchangeable substance known. It must constitute, therefore, one of the most powerful applications known, but really the most durable one in existence.”

Several of the practical purposes to which this valuable article may be advantageously applied are so important, that they may be specially adverted to with advantage.

1. As a covering for manure and compost heaps, no other substance is more suitable. Its capacity for absorbing ammonia and carbonic acid gas renders it the efficient means of preserving much of the effluvium which is usually permitted to escape into the air during the fermentation of manure. Much has been written on the necessity of due care on this branch of farm economy, and many suggestions have been offered on the best methods of remedying the evil. To prevent, in a great measure, this loss of fertilizing power in manure, no agent is more certainly efficient than charcoal. Equal in capabilities to any other, it is accessible to almost a nominal cost; easily applied to the surface of the manure-heap, its action is not impeded by any irregularity in the application, as would be the case with many chemical agents which are recommended for the purpose of fixing the gases, substances of which the cost—in the first instance not insignificant—is augmented by the injudicious use of them, arising from imperfect knowledge or inattention. Of itself, also, it carries to the heap, and afterwards to the soil, physical and chemical properties which have been stated to be favorable to vegetation.

2. As an auxiliary to artificial or highly azotized manures, charcoal is a substance much esteemed.

For the purpose merely of giving bulk, these manures frequently require to be mixed with other substances. By this step an even distribution, either by drill or hand, is facilitated, and danger to the seed from contact with the manure is avoided. Charcoal is eminently capable of insuring these advantages, and, at the same time, it is materially useful, when applied in conjunction with potent and active manures, in absorbing the ammonia that may happen to be liberated more freely than can be appropriated by the plant in its early stages. Mixed with guano, an inodorous compound is formed; and numberless experiments with this and other azotized manures, in conjunction with bulky carbonaceous substances, have been successfully carried out.

With reference to its agricultural value as an absorbent, its uses upon the liquid and solid manures indicate how easy it would be, by a simple but well-regulated system, to mix the valuable excrementitious substances, that exist in such enormous quantities in towns, with charcoal, and thus prevent all escape of noxious effluvia, and convert it into a useful, portable, and inodorous manure.

Urate.—This substance has been highly extolled as a manure. It is only within the last ten years that it has been used by English agriculturists. It derives its name from being a compound of urine and plaster of Paris, and is formed by mixing sand and burnt gypsum with urine, and forming a hard compound, which is afterwards reduced to powder.

The Royal Society of Agriculture at Paris caused some experiments to be made with this manure, for the purpose of comparing it with some of the most effective manures then in use. The result was in favor of

the urate for the duration of its effect on lucern in a light soil. The portion manured with the urate produced the greatest return at the third and fourth cuttings; when that manured with night soil and pigeon's dung had lost a portion of their effect. It requires a moist season to act powerfully. When mixed with dried night soil its effect on various crops is very great—more especially upon potatoes, carrots, and turnips. For the latter it is particularly adapted, as it promotes a rapid growth, and rarely fails to produce a full plant and great weight per acre.

The urate of the London Manure Company, of which a specimen was exhibited, has now been used successfully for nearly ten years. It is now prepared in a concentrated form; one ton will be found sufficient for six to seven acres of land; at seven guineas per ton. It can be sown either by the hand or by the drill, and in either case it is desirable that it should not be placed more than two or three inches from the surface. Unlike guano, it does not destroy the seed if in immediate contact; though in all cases it is better to mix it with a few ashes, to make it drill more equally. The following is a testimonial as to its effects:

OAKLEY BEDS, *August 29, 1849.*

SIR: I beg to furnish you with an account of a field of ten acres, manured in 1845 with six hundred weight of the urate per acre. The first crop was Swedish turnips, and by far the best crop in the parish. In 1846 the crop of barley was great, both as regards straw and yield. In 1847 white clover; fed until 20th May by sheep, and in the autumn mown for seed; the crop very good. In 1847 the same field was wheat, and a most excellent crop. The field the following year was again turnips, grown with six hundred weight as before, and again the best crop in the parish. I have used this year four tons of urate for turnips, on another part of the farm, and am happy to say they are very fine, and have escaped the ravages of the fly, which is not the case with some manured with dung.

I am, yours, &c.

W. ANDERTON.

Nitrate of Soda has lately engaged much attention, and is supposed to exert its favorable action upon vegetation by yielding nitrogen. The experiments hitherto made do not warrant us in concluding with positive certainty that it is the nitrogen alone to which it owes its efficacy; but they certainly render this a plausible explanation of its virtues. The usual effect produced by nitrate of soda is to increase the intensity of the green coloring matter, to augment the quantity of straw, but to produce a light grain. There is nothing opposed to the supposition that nitric acid may be decomposed by plants, and its nitrogen assimilated. We find that vegetables possess the power of decomposing carbonic acid, and of appropriating its carbon for their own use. But this acid is more difficult to decompose than nitric acid. There are other circumstances which oppose the adoption of the view that nitrate of soda acts by virtue of the nitrogen which enters into its composition. Were this the case, the action would be more uniform than it has hitherto been found to be. On some soils the salt does not possess the smallest influence; whilst on others it affords great benefit. We can only furnish an explanation of this seeming caprice by a reference to the chemical composition of the

soil to which it is applied. If the advantages attending the application of nitrate of soda are due to the alkaline base which it contains, then it is evident that this manure can be of small value on soils containing a quantity of alkalies sufficient for the purposes of the plants grown upon them; whilst, on the other hand, such as are deficient in these must experience benefit through its means. In certain cases in which nitrate of soda has failed, nitrate of potash (saltpetre) has been very successful. Analyses of wheat grown with nitrate of soda and nitrate of potash would be of interest, in order to determine whether a mutual substitution of their bases is effected.

On light barley soils, the effect of nitrate of soda has been universally successful when applied at the rate of three-quarters of a hundred weight, or one bushel, per acre. Much, however, remains yet to be proved: whether, for instance, a still smaller proportion per acre, either in its simplest state or mixed with other manures, such as with ashes or gypsum, when it is used for the grasses, or when employed for corn crops by merely well incorporating it with a sufficient quantity of finely sifted earth to insure its uniform distribution over the field, would not render it more efficient.

Patent Inorganic Manures; prepared at Bow, London.

If we may judge from the numerous flattering testimonials respecting the use of these manures, we should say at once that the farmer can have no better compound in the shape of manure than the inorganic. A distinct manure is prepared for the different crops, so that the agriculturist has but to name the crop he wants to produce, and a manure is prepared especially adapted for that crop, which hitherto, so far as we can learn, has not failed of success.

The company, in their prospectus, state that their principle is to supply, in special and distinct manures, all the substances required to be present in the soil for the production of the largest crops. A separate manure is prepared for each crop, adapted to its particular wants, in order to supply the soil with all the food or elements required from it. As far, therefore, as manure can, they insure good crops; because, unlike other artificial dressings, their effects are to enrich, and not to exhaust land. Every crop grown takes from the soil nine or ten inorganic elementary substances. If only one, two, or three of these be supplied, as happens in the use of guano, nitrate of soda, bones, saltpetre, wool, rape, rags, soot, salt, lime, &c., the crops can only be obtained by impoverishing the soil; and if the use of such substances as manure were continued alone on the same land year after year, their true character and action would soon be seen; for they must always ultimately fail, by exhausting and rendering barren the land. The use, too, of one manure for all crops is almost as much a quackery as one medicine to cure all diseases; for the rotation system of cropping fully proves that different elements of the soil are required by, and ought to be supplied to, the various plants. A few hundred weight of manure applied per acre may seem to some insufficient; but it must be remembered that plants are formed chiefly of matter drawn from the atmosphere and water; the ash left after their combustion being really all that is taken from the soil. Dung, as it decays, acts as a manure, by again supplying to the soil the substances found in the ashes of plants; and it is by the presence of these ashes in the soil, or by the supply

of them in manure, that plants are enabled to appropriate from the air and water the elements of which they are chiefly formed. The quantity per cent. and the composition of the ash vary in different plants and grain; but the ash of any particular plant is always essentially the same, whether the plant be grown on chalk, clay, or sand. By using, therefore, manures similar in composition to the ashes of plants, we are enabled to produce good crops on all soils—to grow wheat year after year on the same land, and to render poor soils gradually as productive as rich. That the inorganic manures do enrich the land, and that these principles are correct, is fully proved by the accumulated evidence of upwards of ten years' use; and they were the first and only manures offered to the farmer based on a true and scientific principle, which has been since approved and recommended by the highest authorities.

These manures require no mixing for use; nor is any other matter needful. They are lasting in their effects, and any portion not taken away in one crop remains to benefit the next; so that, when once on the land, they must always effect good more than equal to their cost. They should be sown generally broadcast, or drilled, so as not to be in contact with the seed; on stiff land, it is desirable to harrow or hoe them well in, or to plough them lightly. The effect of any dressing of this manure will be found quite equal to dung, and the continued use of them must make the land cleaner, and free it from vermin.

The price is £7 per ton, and the quantity per acre three to six hundred weight. A farmer, writing from Tunbridge Wells, Kent, says:

"I have used in one year nearly £250 worth of your inorganic manures for wheat, oats, and peas, and confidently assert, and feel it my duty to confess, that the benefits in the several crops where it was duly applied so far exceed all other kinds of manure, that I have much satisfaction in recommending it to my friends and the public generally. I also witnessed its effects on hops, where different manures were tried. The land was divided into three parts—one portion manured with sprats, another with rotten dung, and the third with your inorganic manure. The result is manifestly much in favor of your valuable invention."

PART II.—MINING AND MINERALS.

Mining, Quarrying, Metallurgical Operations and Mineral Products.

The objects exhibited in mining and metallurgy were extremely varied and interesting. They comprehended specimens not only of all the more important mineral ores, building stones, gems and native metals, but also numerous illustrations both of their useful applications and of the several processes by which the natural productions of the mineral kingdom are made subservient to the daily wants of man.

On the west end of the building, extending along the southern wall, was placed the mining and metallurgic collection of Great Britain. These were found a very excellent educational collection of minerals, together with a set of apparatus necessary to enable the student to examine chemically the substances brought under his notice.

Plumbago.—This plumbago was from the mines of Borrowdale, England, which produce the best black lead for the manufacture of pencils. This substance is found in irregular deposits, which usually occur in granite, gneiss, mica, slate, or graywacke; as also sometimes, though more rarely, in the coal formations. At Borrowdale, in order to prevent robbery, it is found necessary to protect the entrance to the pit by a strong building, where the men change their clothes on leaving the mine, and where they are carefully watched by proper superintendents, to prevent their taking with them any portion of the valuable commodity. This mine is usually worked for a period of six weeks only during the year. Its net produce has often amounted to £40,000 per annum.

China Clay, or Kaolin, from St. Stephen's, Cornwall.—This substance is produced by the decomposition of the feldspar occurring in granite rocks, which, by losing a portion of its alkaline constituents, leaves a substance rich in silica and alumina, but retaining a very feeble percentage either of potash or soda. This kaolin is separated from the silicious sand, with which it is invariably associated, by being exposed to a current of clear water, which leaves the sand behind, while the clay is carried off in suspension, and subsequently deposited in deep pits, in which it is allowed to settle. In connexion with the kaolin are exposed specimens of what is called China stone, which appears to be feldspar in a less decomposed state than where it exists as kaolin. This stone, from still retaining a large amount of the alkalies originally contained in the feldspar, is fusible at a high temperature, and it is consequently used in forming the transparent glaze with which the surface of the object previously formed in clay is covered, before being brought to a finished state. The works employed in extricating and preparing the China clay give labor to a large portion of the population of St. Stephen's.

Various models illustrating the methods of working and ventilating Coal Mines.—One of these consisted of a very simple contrivance, by which wagons passing through a level are made to open and shut the various doors established in different places to facilitate a free circulation of air. By this contrivance the constant attendance of a man to open the door on the approach of the wagons is obviated; and as the work is so much more surely and readily done by the wagons themselves, one great cause of accidents is thereby avoided. Another machine for the ventilation of the collieries involves a principle seldom resorted to for this purpose. The current of air is obtained by the rapid motion of a wheel, having a series of radiating tubes, connected with a hollow axle, forming the extremity of the pipe by which the contaminated air is to be exhausted. When this mechanism is made to revolve with great rapidity, by means either of steam or water power, a current of air is by centrifugal force established from the centre of the periphery, and a corresponding movement of exhaustion is induced in the central column, forming the prolongation of the axis of the apparatus connected with the upcast shaft to be ventilated.

Circular Buddle.—A very valuable and interesting contrivance for the dressing or separation of metallic ores from the many earthy impurities with which they are invariably found associated. It is intended to effect the final separation of the slime or pounded earthy matter from the metalliferous particles, with which it is more or less mixed. It consists of a hollow shaft, carrying two brushes, which continually sweep the

surface of the circular space, of which the extremities of the brushes describe the circumference. The mineral, in the form of a thin paste, suspended in water, is allowed to enter this area through the hollow spindle in the centre, and as it is then constantly brushed over the floor, which is higher in the middle than towards the edges, it is evident that the metallic or heavier portions will arrange themselves nearly in the order of their respective densities, and accumulate on the central part of the buddle.

Patent Fuel.—There are several specimens of this. It is composed of coal-screenings, mixed either with pitch or coal tar, and then lightly forced into a proper mould, usually in the form of bricks. In some instances the excess of pitch and tar is subsequently eliminated by the bricks being heated to about 600° Fahrenheit in ovens properly constructed for that purpose; while in other cases the coal dust is made to assume solid and regular forms by great pressure only. The advantages of this fuel are that it is less likely to crumble than common coal during a long voyage, and it also stores into less space; but, from the impurities which are always associated with the small coals employed, it is nevertheless liable to produce a large quantity of ash and clinker on the base of the furnace.

Coal.—Pit coal, which is now raised in England to the annual amount of more than 35,000,000 tons, and the applications of which are daily becoming more extended, was but little known in England, as an article of commerce, prior to the commencement of the thirteenth century. In the year 1238, the first researches for this mineral were commenced on the high ground in the neighborhood of Newcastle-upon-Tyne. These were followed in the year 1330 at the coal field at Colliery, near Lanchester; in 1343, at Merrington and Ferry Hill; and in 1500 the several collieries at Gateshead, Whickham, and Tynemouth were first opened. At this period the principal demand was for the use of blacksmiths and limeburners, who appear to have been in the habit of employing this fuel long before it came into anything like general use for household purposes. The mechanical resources of the miner were of a very limited nature, and the principal part of the coal extracted was consequently raised from such situations as afforded considerable facilities for the removal of the water which naturally drains into all subterranean excavations. In the earliest periods of coal-mining, this was drawn off through the level, or gallery, by which the fuel itself was carried to the surface; but as the demand for the latter became more extensive, the mines were gradually worked at greater depths. This was effected either by extracting the water by an endless chain, carrying a series of properly-arranged buckets, or by a system of pumps, worked by a water-wheel. The aid of horses was also frequently called in; but these were only employed in situations where water-power could not be obtained; and they were subsequently superseded by windmills, which either raised the water by an endless chain, passing over pulleys, or by pumps, worked by a due arrangement of cranks. The discovery of the steam-engine has, however, produced by far the most important revolution in this branch of industry; for, by means of this machine, the working of the mines is not only in a most remarkable degree facilitated, but, from the immense demand thus created for fossil fuel, the extraction of coal has become a most important branch of national industry in all those countries which

have the good fortune to possess large deposits of this invaluable production.

England and Belgium are, in proportion to their extent, the richest with regard to the coal fields which they contain. In the former country, the coal deposits are estimated at $\frac{1}{20}$ of the total superficies of the Kingdom; whilst in Belgium they are supposed to occupy about $\frac{1}{4}$ of the entire surface of the country. In France, all the known deposits scarcely occupy $\frac{1}{60}$ part of the soil; and all the other European States are much poorer still in this respect. Sweden, Norway, Russia, Italy, and Greece are almost entirely without these formations. Bohemia is, in this particular, the richest part of Germany, although its annual productions are far from being considerable. Spain, Portugal, Austria, and Poland have likewise their beds of coal; and the mineral is also more or less abundant in India, China, Madagascar, Van Dieman's Land, Borneo, and the other East India islands, New Holland, and at Concepcion Bay, in Chili.

In Great Britain there are several extensive coal districts, among the most important of which may be named those of Wales, Newcastle, Lancashire, Derbyshire, Staffordshire, and Scotland. The veins are worked by means of shafts and galleries, in the same way that the metallic minerals are extracted from the lodes in which they are found; but, as the seams of coal are generally much more extensive than the metallic deposits, and as much larger masses are removed from the interior of the mines, the greatest care is required not only to prevent the crushing together of the workings, but also to introduce a current of air into every part of the colliery, so as to supply the workmen with fresh air for the purpose of respiration, and to prevent the accumulation of the explosive gases which frequently issue from the beds of coal. The very numerous varieties of coal have given rise to distinctions, founded partly on its age and appearance, and partly on its quality. In all kinds the structure of the wood from which they are supposed to have been formed is obliterated, although partial impressions of plants, indicating their origin, frequently occur. The coals form a more or less compact mass, of a dark-brown or black color, sometimes dull, but more frequently possessing a vitreous lustre, which often exhibit a decided iridescence. Their specific gravity is considerably above that of wood, and their structure decidedly granular. They are always distinctly stratified, and have generally a cleavage at right angles to the plane of deposition. The different laminæ of which they are made up are usually in close contact with each other; but are sometimes separated by thin layers of other minerals—such as iron pyrites, carbonate and sulphate of lime, galena, sulphate barytes, the soda salts, and still more frequently by a double carbonate of lime and iron. The fracture of the shining kinds of coal is conchoidal; that of the duller varieties is hackly. Common coal, and particularly that from the newer formations, is frequently observed to be made up of layers of very different appearance—the one kind, which is black and shining, with a conchoidal fracture, is rich in carbon; whilst the duller varieties are of a brown color.

The composition of the ashes of coal is in a great measure determined by the nature of the rock in the vicinity of the seam from which it is extracted; for, besides containing the inorganic elements originally forming part of the plants by the decomposition of which the coal has been pro-

duced, they will also, to a certain degree, consist of earthy particles, deposited in the pores of the coal by the infiltration of water from the overlying strata. The chemical composition of coals varies according to their different geological ages, and the localities from which they are obtained; but although they differ considerably in the relative amount of their various constituents, the nature of their ultimate elements is invariably found to be the same. All kinds of coal are, essentially, composed of carbon, hydrogen, and oxygen; but, besides yielding a certain portion of silicious and earthy residue and of sulphur, they usually afford traces of nitrogen, arising from the multitude of organic bodies, of which they contain the remains.

Among the specimens of coal exhibited, there was anthracite, from Tenby, South Wales; from the county of Tipperary, Ireland; and from the western side of the Vale of Neath, near Swansea. This substance is the oldest of all kinds of fossil fuel, and is chiefly found in the transition formation; its structure is perfectly homogeneous; its fracture, conchoidal; and its color of a jet black, with a vitreous lustre, which frequently shows a powerful play of colors. This coal contains an extremely large proportion of carbon, with but a small amount of volatile constituents, and is consequently totally unfit for the manufacture of gas, although well adapted for many purposes requiring intensity of heat and durability in the furnace. From the composition of this fossil, being more nearly allied to that of coke than to that of ordinary coal, it is frequently employed in lieu of the former, and is extensively used in iron furnaces where the hot blast has been adopted.

The per centage composition of two of the above-mentioned specimens, as stated by Sir H. T. De la Beche and Dr. Lyon Playfair, in their first report on coals suited to the steam navy, is as follows: Anthracite from the Vale of Neath: carbon, 91.69; hydrogen, 0.79; and ash, 1.50. Anthracite from Tipperary, Ireland: carbon, 80.18; hydrogen, 2.21; oxygen, traces nitrogen, 0.23; sulphur, 6.76; and ash, 10.71. The specific gravity of the former specimen was found to be 1.357, and that of the latter, 1.590.

Among the specimens from the Welsh coal fields will be observed the Powell's Duffryn, the Aberdare Company's, Merthyr Nixon's, Merthyr and the Risca black vein, together with coal from the Llangenneck Company, whose mines are situated at a short distance from the port of Llanelly. The coals from the above districts are usually characterized by an irregular brilliant fracture, and many portions will be observed to possess a peculiar radiated appearance, seldom noticed in coals coming from other parts of the country. When used under a steam boiler, they are found to light easily and to blow off steam readily, with the production of but little smoke or soot. This variety of coal, which has also a very high evaporating value, is well adapted for the generation of steam, and is largely employed for this purpose in the navy, where its smokeless properties are evidently most useful.

The specific gravity of this class of coals usually varies from 1.29 to 1.35. In order to afford a general idea of the chemical constitution of the coals from this part of South Wales, we will select, as an example, from the report already quoted, the analysis of the Birch Grove Graigola, which, although one of the best varieties belonging to this class, very fairly represents the average per centage composition of good Welsh coals.

The results obtained by the analysis of a fair sample of this product are as follow: Carbon, 90.94; hydrogen, 4.28; oxygen, 0.94; nitrogen, 1.25; sulphur, 1.18; and ash, 1.41.

From the Lancashire districts there were coal, cannel coal, and coke, the produce of the different seams worked by the Moss Hall Coal Company, at Ince, near Wigan. The coals from this part of England are of good quality, but are harder, and possess a more cubical fracture, than those from the South Wales coal fields; they likewise contain a larger proportion of ash, and give off considerable quantities of smoke when first lighted. The per-centage of hydrogen is, moreover, greater in these coals than in the Welsh varieties, and they are therefore used more frequently for the manufacture of gas. Cannel coal is a smooth, almost vitreous substance, with a conchoidal fracture, and brown, black color, and is chiefly employed for gas-making, for which its composition eminently adapts it. The cannel coal raised from the above mines is of good quality, and produces an extremely pure and highly illuminating gas. The composition of an average sample of cannel coal is as follows: Carbon, 80.21; hydrogen, 6.30; oxygen, sulphur, and nitrogen, 8.54; and ash, 4.95.

One ton of coal having the above composition will, on being carefully heated in proper retorts, yield 11,000 cubic feet of gas, capable of affording, during its combustion, an amount of light equal to that obtained from 1,150 best spermaceti candles. Coal of this description would be still more largely employed in our gas houses if the coke obtained from it were of good quality; but this is of such a crumbling nature, and possesses so little durability, as to be of no value except for the burning of lime, or similar purposes. The coals from the Derbyshire district are distinguished by a peculiar hackly structure, and a tendency to split into long prismatic fragments. They likewise contain a rather large per-centage of ash, and frequently iron pyrites and white shale. Among the specimens exhibited from this district are samples from the Butterly Iron Works near Alfreton, which very fairly represent the fossil fuel of the neighborhood, and of which the composition is, according to the official report, as follows: Butterly Company's Portland coal—carbon, 80.41; hydrogen, 4.65; nitrogen, 1.59; oxygen, 11.26; sulphur, 0.36; and ash, 1.23. This coal has a specific gravity of 1.301, and affords 60.90 per-cent. of friable coke.

The coals of Yorkshire have in general a more schistose appearance than those of the last-mentioned county, but they are nearly similar in point of composition and evaporative value. From the Staffordshire district some immense pieces were sent to the Exhibition. This variety affords, from the nature of its structure, great facilities for removal in large masses, as was seen from the block raised from the Denbigh Hall Colliery, near Tipton, and was found at the western entrance of the building.

In this department of the Exhibition were also found coals from the Scotch coal fields, and particularly from those in the neighborhood of Edinburg. Among these were samples from the Dalkeith Colliery, worked on the Midlothian coal seams. This coal is of the variety called "splint," and burns with a long flame and much smoke. It is also good for the purpose of gas-making, as may be inferred from the follow-

ing analysis: Dalkeith coronation seam—carbon, 76.94; hydrogen, 5.20; nitrogen, trace of sulphur, 0.38; oxygen, 14.37; ash, 3.10.

Tin.—In Cornwall most of the valleys in the tin districts produce sands containing the peroxide of that metal, which is extracted by subjecting them to a stream of water, where the greater density of the ore causes it to remain, while the lighter substances are carried away. The great proportion of tin raised, however, is procured from the mines; and as the process adopted with the best success in the oldest mining region in Europe cannot fail to be of use in the United States, it needs no apology for giving a detailed account of it here.

In order to ascertain the existence and direction of the mineral veins, what is called "shoding," or "costeaning," is adopted. When the general direction of the lodes of a neighborhood has been determined from other mines, a series of pits are sunk at right angles to the assumed run of these lodes. These pits are about three feet in width, six feet in length, and extend in depth through the alluvial deposit a few feet into the underlying well. In order to avoid the chance of missing any lode, the pits are sunk at regular distances, and are united by galleries from one to the other. Where the direction of the lodes is *not* known, two series of pits are arranged at right angles to each other.

When a lode has been discovered, the first operation is to drive what is called an *adit* level. This is a gallery cut a little above the level of the nearest valley, in such a way as to intersect the lode at a certain distance from the surface, and draw off the water from the higher portions of the vein. Should the appearance of the lode then prove favorable, a shaft is sunk to intersect the mineral deposit, to serve as the means of descending into the mine, and of removing the ore. Other shafts are then sunk, as occasion requires, and other levels are driven. Galleries are also excavated in the substance of the ore itself, for the purpose of extracting its contents. In the Cornish mines these galleries are at 10 fathoms distance.

The tools employed in tin-mining vary according to the nature of the ground. If the well be moderately soft, nothing more than an ordinary pick and shovel are used; but if it be hard, and is either stratified or contains numerous fissures, recourse is had to steel gads, or wedges, by driving which into the crevices of the rocks the miner is enabled to split off large portions. Gunpowder is also often used.

Copper.—It was much to be regretted that the rich copper ore of the United States should not have been more fully represented at the Great Exhibition. There were, indeed, a few specimens, two of which, both for size and richness, were remarkable in comparison with all other samples of copper ore exhibited. But as an example of what our inexhaustible mines of copper are—as a fair exponent of what we are every year excavating from the earth, and what we are destined to excavate in years to come—these were, in fact, nothing.

The English collection of copper ores was very great. The owners and proprietors of the copper mines meant to convey a forcible idea of the source from whence the great mass of their commercial copper was obtained, and they succeeded. These specimens, however, consisted almost exclusively of what miners call yellow ore or copper pyrites. In this mineral, the copper is combined with iron and sulphur, which latter seldom reaches to less than 30 per cent. of the entire weight. In ex-

tracting copper from copper pyrites, it is customary to burn off the whole of this sulphur, and permit the resulting sulphurous acid to pass away with the products of combustion from the furnace. This is the plan at present adopted, both in our own country and in all others where the metal is produced from this kind of raw material.

To say nothing of the intolerable nuisance thus created, it seems to involve also a great loss. English chemists are asking why this sulphurous acid should not be devoted to some use; and the question is certainly equally applicable to the United States. Estimates have been made, by which it was shown that at the mines of Swansea alone not less than 1,000 tons per week were thrown away. This amount, if converted into sulphuric acid, (an extremely marketable commodity,) would yield 2,700 tons of that substance; worth at least £2,500 sterling. Hence, the sulphur, equivalent to £1,800,000 worth of oil of vitriol, is every year converted into "thin air," and lost, at one English mine, through want of knowledge or skill to devise a means of securing or arresting sulphurous acid. It is true that sulphurous acid cannot be condensed. It is equally true, however, that it can be easily and cheaply converted into sulphuric acid; which last, as is known to all chemists, readily admits of condensation by steam or water alone. The mode of working sulphuret of iron is everywhere known, and it affords an exact analogy for guidance in the case of sulphuret of copper. When a small quantity of nitric oxide is added to sulphurous acid, in contact with water and air, sulphuric acid is the result; for this, in fact, constitutes the ordinary mode of making oil of vitriol. Moreover, as in the manufacture of oxalic acid this nitric oxide is itself a waste product, it surely would be worth while to try the effect of mixing these two valuable gases in a horizontal flue, containing a thin strature of water, or filled with pieces of pumice stone or coke, moistened with water. Suppose, for example, that the waste nitric oxide of an oxalic-acid maker were admitted into the sulphurous flue of copper works, is it not extremely probable that such an amount of condensation would ensue as to indemnify the trifling outlay of labor and expense consequent upon so simple a process? It may be urged, perhaps, that the sulphuric acid so obtained must always contain arsenic, and, therefore, prove inadmissible for some purposes; but is not this already the case with sulphuric acid made from sulphuret of iron, which invariably contains arsenic?

Various plans have been devised for decomposing the sulphurous acid of copper works, by heating it in contact with hydrogen, or carbonic oxide gas, so as to deoxidize or reduce the sulphur it contains. But these have been unsuccessful, and are rather theoretical or retrograde movements made in the study than the practical experiments of business men.

Cobalt.—The specimens of this metal from Great Britain were few. The richness, also, of those which were exhibited fell far below those which were to be found from the continent. Northern Germany exhibited many rich samples of that which has become to her free towns and States a great source of commerce. Norway also exhibited a good number of samples, arranging them side by side with the results of their fusion, zaffre and speiss. The following remarks upon this subject, from Newton's London Journal and Repertory of Arts, are so well expressed, and bear so directly upon what may become a branch of industry in the United States, that we venture to insert them entire:

“Mingled with the beautiful samples of copper pyrites and argentiferous galena displayed in class No. 1 of the Great Exhibition, there are to be found several specimens of cobalt and nickel ores. These valuable articles lie buried beneath the huge bulk of their better-known compeers, and, unless sought for, will fail to arrest the attention even of a scientific observer; thus singularly illustrating, in the Crystal Palace, the obscure position they occupy in the manufacturing industry of the nation. The art of working the ores of cobalt and nickel seems unknown in Great Britain, if we may judge by the fact that, though found in sufficient abundance, they are nowhere, in this country, converted into zaffre and speiss, the two primary marketable products elsewhere obtained from these ores. Although, therefore, no nation in the world consumes, in its manufactures, more cobalt and nickel than Great Britain, yet, for these metals, it is entirely dependent upon Norway, northern Germany, and the Netherlands, from whence we import annually not less than 400 tons of zaffre and smalts, and nearly the same quantity of nickel and speiss, to the conjoint value of about £150,000 sterling. As these substances serve very different purposes in the arts, we propose to speak of them separately, merely premising that cobalt forms the basis of all the blue colors seen on earthenware, whilst nickel is an indispensable ingredient in the various metallic alloys known under the terms albatra, German silver, &c. The specimens of ore previously alluded to as existing in the Great Exhibition have been derived from Cornwall, and contain, as is generally the case, both nickel and cobalt, thus far being precisely similar to the ores worked in Norway and northern Germany. The foreign ores are, however, much richer than the Cornish, since these latter seldom contain more than from two to seven per cent. of available metallic matter, whilst the former not unfrequently yield 12 or 15 per cent.; consequently, a process which answers quite well with the one may fail altogether, or prove profitless, with the other; and this is exactly the whole secret of our national failure in working cobalt ore.

“The Swedish method has been tried in several parts of Cornwall, and has not, in any one instance, given a satisfactory result; hence the Crystal Palace contains no specimen of British zaffre; and our potteries, glass works, and paper manufactories procure from abroad that which ignorance and apathy deny them at home. In the German ore the quantity of metallic ingredients is not only larger than in the Cornish, but also of a more fusible character; consequently, when simply subjected to heat in a reverberatory furnace, the earthy and metallic elements separate of themselves by the mere disparity of their specific weights, and the silicious gangue, with a portion of oxide of iron, rises to the top, leaving a metallic compound of arsenic, cobalt, nickel, copper, and perhaps iron, beneath. This latter, when carefully roasted in an oxidizing furnace, in contact with sand or ground flint, affords at once an impure silicate of cobalt and arseniuret of nickel—two marketable products. The Cornish ores, from their metallic poverty, will not undergo the first fusion necessary to separate the silicious matrix of the mineral. And this trifling impediment seems actually to have benumbed the energy of that indomitable spirit of enterprise for which Britain is, in most things, justly celebrated. In the manufacture of iron, limestone is used to render the alumina and silica of the ore fusible; and, without this, no iron can be procured by the ordinary process. In roasting lead ore, lime cannot be

dispensed with. In copper-making not only lime, but also fluor spar, is frequently needed; and the commonest cobalt ores of Cornwall clearly require nothing but a proper flux to afford a compound of arsenic, cobalt, and nickel, perfectly analogous to that procured from the German ore by mere fusion without a flux. The whole question, therefore, really resolves itself into the discovery of a cheap material, capable of easy vitrification with the granitic matrix of the Cornish ore, and which is nevertheless devoid of action upon the arseniurets of cobalt and nickel. The common fixed alkalies, though answering the first indication admirably, would not comply with the second condition; hence potash and soda—these great helpmates of industrial skill—are unfortunately excluded from the list of agents, as they act powerfully upon all the arseniurets, and would merely produce a worthless frit with the ore. Similar objections attach more or less to the alkaline earths, and therefore lime requires to be looked upon with suspicion. Borax would, and does yield a satisfactory result; but its high price is an insurmountable obstacle. Fluor spar is of no avail; and bottle glass requires too strong a temperature, and to be used in too great a quantity, for economical application to a mineral already surcharged with extraneous matters.

“These facts serve in some measure to explain, though we cannot allow that they in any way justify, the present condition of the zaffre market, since these very difficulties are daily overcome in one of the largest metallurgical operations carried on amongst us. Many of the ores of copper, when first received by the manufacturer, are in a state quite parallel to that of the Cornish ores of cobalt, even in regard to poverty of metal: there is the same excess of granitic matrix, the same necessity for avoiding the use of any agent capable of attacking sulphuret of copper—a substance possessing very similar chemical affinities to those of the arseniurets of nickel and cobalt. What, then, is the flux employed by the copper manufacturer in such cases? We reply at once, it is the protoxide of iron, which is formed from these poor copper ores by the action of heat, and combines with the silica of the matrix, so as to produce an extremely fusible silicate of iron, which permits the sulphuret of copper to fall down to the lower part of the reverberatory furnace, whilst the vitrified impurities of the ore are raked from its surface. Oxide of iron would most probably, therefore, enable a manufacturer accustomed to furnace operations to send into the market an arsenical compound of cobalt containing more than 50 per cent. of this metal, even if his interest failed to convince him of the great advantage resulting from its subsequent conversion into zaffre. Thus, then, the conditions of this seemingly difficult problem are answered, in a commercial sense; for oxide of iron is plentiful and cheap, its combination with silica is sufficiently fusible, and it has no action whatever upon metallic arseniurets. No doubt many other substances might be found equally applicable with the one we have mentioned; and, indeed, our object in thus dilating upon this and analogous topics, is rather to stimulate inquiry than lay down specific rules for practical guidance; consequently, our remarks must be regarded, at best, as but a shadowy outline, the manufacturing details of which require careful filling in to render the whole intelligible and useful.

“Before quitting the subject of cobalt, it may be as well to advert to a peculiar ore of that metal found near Keswick, in Cumberland. This

ore contains from two to three per cent. of cobalt, but is quite free from nickel, though this last metal not unfrequently exists without cobalt. As a coloring material, oxide of cobalt is seriously damaged by the presence of oxide of nickel; for these oxides produce colors almost complementary to each other, and therefore tending, by their admixture, to yield a neutral tint, as is observable when their saline solutions are united. The great advantage of working an ore of cobalt free from nickel must consequently be obvious to all. The Keswick mine is, nevertheless, almost abandoned at the present moment, through sheer inability to find a market for its produce; though for the finer kinds of porcelain, and for enamel painting, the oxide of cobalt procured from it is worth fully a guinea per pound.

“In the hope of drawing attention to a raw material at once so unique and valuable, we give the following original process for extracting pure oxide of cobalt from the Keswick cobalt ore: Having carefully roasted a quantity of this ore, at a full red heat, in a muffle furnace, for two or three hours, it is next to be reduced to a fine powder, and then digested in muriatic acid of the specific gravity 1.10, or thereabouts; and for this use the waste acid of the soda maker is well adapted, even though it may happen to contain arsenic and iron. After a few hours' digestion, the acidulous solution may be poured off and fresh acid added, so as completely to exhaust the roasted ore, and dissolve all the metallic matter in it; then mix the solutions thus procured; and, having thrown in a portion of powdered hematite, or other form of peroxide of iron, evaporate the whole to dryness; next pour boiling water on the dried mass, and stir in an excess of chalk, whiting, or finely-powdered marble, and preserve the whole at a temperature of about 180 degrees Fahrenheit, until all evolution of carbonic acid ceases; then add a quantity of sulphate of soda, and throw the mixture on a filter, when a solution of chloride of cobalt will pass through, containing a small quantity of the sulphates of lime and soda, but altogether free from metallic contamination. This solution must now be supersaturated with a caustic lye of soda, and the mixture boiled for a few minutes, in order to insure the rapid precipitation of the oxide of cobalt, which, after careful washing with hot water, is to be dried and heated red hot, in a crucible, to give it the character suitable for the English market. One pound of Keswick ore will require about eight ounces of muriatic acid, of the kind alluded to, with two ounces of hematite, three ounces of chalk, and the same quantity of salt cake or dry sulphate of soda. The explanation of this process is very simple: in the first instance, the metallic matters of the ore—consisting of iron, cobalt, arsenic, copper, and perhaps, also, lead—are dissolved by the muriatic acid; and, as all of these are precipitated by carbonate of lime, except cobalt, the chalk might now be added at once, but for the fact that the Keswick ore contains an excess of arsenic, which carries down a portion of cobalt in the state of arsenite of cobalt. To remedy this evil, peroxide of iron or hematite must be added, so as to insure the existence of an excess of peroxide of iron in the solution, as this, on the introduction of the chalk, will unite to the arsenic, and thus prevent the precipitation of any cobalt at this stage of the operation. The cessation of all effervescence indicates that the chalk has ceased to act, and that the iron, arsenic, copper, and lead are no longer in solution, but have been displaced by the lime of the chalk. To remove this

lime, sulphate of soda is employed, since this throws down nearly the whole of the lime in the state of sulphate; after which caustic soda, or potash, will precipitate nothing from the filtered solution but pure oxide of cobalt. Although apparently somewhat complex in detail, this process is extremely simple and efficient in practice, and possesses, moreover, the advantage of being equally applicable to the treatment of speiss or arseniurets of nickel, from which pure oxide of nickel may easily be procured; using, however, much more hematite than the quantity indicated above, in consequence of the absence of iron in speiss. From this latter circumstance, it must be obvious that cobalt and nickel cannot be separated in the way just described; for, as has been stated, they both remain in solution after the employment of the chalk; and, indeed, no process has yet been published by which a perfect separation of these two metals can be effected. Ordinary Swedish zaffre contains, on an average, fifteen per cent. of oxide of cobalt, mixed with about three per cent. of oxide of nickel—which latter seriously impairs the coloring power of the zaffre. Hence it is that we have entered thus fully into this question; for, as it is almost impossible to purify cobalt when contaminated with nickel, it is a kind of national disgrace to Great Britain that, having a pure ore of cobalt in the very centre of the island, our manufacturers are unable either to compete with, or so much as contest for the palm of superiority in the formation of zaffre.”

Iron Ores.—England is so justly celebrated for the manufacture of iron and steel, that it seems not inappropriate to the present report to dwell somewhat at large upon the character of her iron ores and the products of her furnaces, noticing at the same time such iron ores from other countries as seem peculiar or remarkable.

The mean richness of the ores of iron in the South Wales coal basin is estimated at 33 per cent. These are the richest ores of England, the average in the Staffordshire district being less than 30 per cent, and those in other districts rarely rising above 25 per cent. This, it will be perceived by all who are familiar with the ore beds in our country, falls far below us, some of our ore yielding as high as 70 per cent of pure iron. In England every ferruginous clay stone is considered an ore of iron when it contains more than 20 per cent of that metal, and the loss of weight experienced during the process of roasting varies from one-fourth to one-third of that of the original crude ore.

To effect the calcination of the mineral, it is piled up in long heaps over a strature formed of large lumps of coal. The fire is afterwards applied to the windward end of the pile, and after it has advanced a certain distance the pile is prolonged with the same material in the opposite direction. The ordinary height of such a heap is from six to seven feet, whilst its breadth at the bottom may be about fifteen or twenty feet. When the ore treated, as is not unfrequently the case, contains a large proportion of bituminous matter, it will, when once ignited, readily burn without the addition of any other material; but when it is not naturally combined with a sufficient amount of combustible ingredients, its place is supplied by the addition of a sparing mixture of small coal.

Instead of this method of effecting the calcination of the ore in open heaps, it is in many localities roasted in a sort of furnace or kiln, similar to that employed for burning lime. In this case, if bituminous, the addition of any other fuel to the mineral is unnecessary; but if not in itself

combustible, it is interstratified, at certain regular distances, with layers, either of coal or anthracite.

The preparation of metallic iron from its various ores depends on the reduction of its oxides by carbonic acid gas, when exposed to its action at a high temperature. With us, especially in the rich ore of the northern and eastern States, and where charcoal is readily procured, metallic iron, in its malleable form, is procured at one operation. In England, however, where charcoal is never cheap, and where the problem sought is to obtain the largest possible per-centage of metal from the ore treated, several distinct processes are resorted to, so similar, however, to those in use by the iron-masters of Pennsylvania that they need not be described.

Among the numerous models exhibited in the mining and mineral department, there was a beautiful representation in miniature of the furnaces and other apparatus employed in the Ebbw Vale Works, near Abergavenny, in South Wales. At this establishment, the gases evolved from the furnaces—and which, from the amount of hydrogen, carburetted hydrogen, and carbonic oxide gases which they contain, are highly inflammable, and capable of developing a considerable degree of heat by their combustion—are conducted by proper pipes and channels to the various places where heat is required, and, being then ignited with a due admixture of atmospheric air, they afford a part, by the use of which the amount of solid combustible employed is considerably diminished. The model exhibited not only afforded an illustration of the way in which these gases were applied to the generation of steam for the blowing engine, but also showed the details of the arrangement by which, at the Ebbw Vale Works, the same agent is made to supply the amount of caloric necessary to heat the blast forced into the apparatus to the temperature of about 400° Fahrenheit—which is that at which the air furnished to hot blast furnaces is commonly supplied.

The model further showed the blowing machine itself, and the engine by which it was set in motion, together with its various appurtenances—such as a large air vessel for regulating the blast, and the nozzles by which it was admitted into the hearth.

Mr. J. James, of Abergavenny, exhibited a model of his invention, the purpose of which is to facilitate the processes of drawing off of the waste gases, with a view to their subsequent employment for heating purposes. It had, however, never been tried, and great doubts were expressed in regard to its practical working utility.

To return to the main subject before us, it is well known that the principal sources of the iron of commerce are the oxides and carbonates of the metal; which, mixed with variable quantities of silicious and earthy matters, are abundantly met with all over Great Britain. The anhydrous peroxide of iron, or red hot hematite, which also frequently receives the name of specular iron-ore, is very abundant. It occurs both in crystalline and stratified rocks, as with us; but the purer varieties are always found in the older formations. There were some five specimens of the red hematite, crystallized, exhibited from the island of Elba, from mines worked by the Romans. Very beautiful crystals of it were shown from Stromboli, as also from Elba, Vesuvius, and *Ætna*, formed by sublimation from the fissures in those volcanic regions. Some of the raw ore was exhibited in the Saxonian department, ground fine for a

pigment, and for the purposes of polishing. As a source—perhaps the greatest source—of the metal, this ore is of importance. Some of the varieties—the specular, for example—have the disadvantage of being somewhat refractory in the furnace; but this inconvenience is entirely obviated by a judicious admixture of other ores. At Newcastle-upon-Tyne it is used to mix with poorer ores; at Ulverstone, the same; while, from the furnaces at Cleaton, there were specimens of iron made from the pure hematite of the specular variety.

Brown hematite, a peroxide, also, is found abundantly in Great Britain; it differs from the red hematite in containing a certain quantity of combined water, and possessing a darker color. This ore frequently occurs here in a friable state; and, when naturally mixed with a considerable quantity of earthy matter, it acquires a peculiar softness of texture, and is known by the name of yellow ochre.

Granular iron ore was exhibited in some fine amorphous masses from Cornwall, and from Sutton county, Ireland. It is not common, nor much employed as an ore, in Great Britain. In Normandy, however, (from which specimens were sent,) in Burgundy, Lorraine, and Berry, it yields an excellent iron when washed, for the purpose of separating the lighter impurities. In what is called the oolitic form, it supplies the greater number of the French iron works. It is said, however, that when the beds of oolitic iron are found to alternate with calcareous deposits, the metal produced is very brittle, (cold short,) and consequently unfit for many purposes. This peculiarity is attributed to the presence of phosphorous, derived from the organic bodies of which chalk is principally composed, and which has the property of rendering iron extremely brittle, even when present in very minute quantities.

The octahedral oxide, or magnetic iron ore, is not used in England, though one fine specimen of it was shown from the Roche Rock Mine, Cornwall. In Sweden, however, it is the common ore in use, and from it the most approved Swede iron is manufactured. It occurs in large quantities in our country, furnishing the basis of much of the best iron from our forges.

The iron ore most in use in England, and indeed throughout the three kingdoms, is spathose iron, or the carbonate of iron. It is found in rocks of very different ages, and is frequently observed to accompany other metallic ores—such as those of lead or copper. Carbonate of iron is, however, most common in gneiss, greywacke, and the coal formations. The extensive beds of Styria and Carinthia occur in gneiss—that of the Hartz is found in greywacke; whilst the English deposits, from which the greater portion of iron manufacture in that country is obtained, are almost exclusively confined to the coal formations.

This mineral is frequently extracted from the same pit by which the coal is raised to the surface; and it either occurs in reniform lenticular septaria, embedded in clay found in the vicinity of the veins, or forms distinct seams, alternating with those from which the coal itself is extracted. The facility thus afforded to the manufacturer by the presence, in the same locality, of the ores, and the fuel required for their extraction, is evidently one great cause of the number of iron works in Great Britain and the extremely low prices at which iron is exported. The principal deposits of this mineral in the United Kingdom are those of Dudley, the products of which are chiefly sent to Liverpool; those of the neigh-

borhood of Glasgow, on the banks of the Great Northern Canal; and those of Wales, on the seacoast.

All coal formations in Great Britain, however, do not produce iron ores. The Newcastle district, which is perhaps the richest in the world in fossil fuel, yields so little iron that the furnaces which are worked in that neighborhood are principally supplied by ores brought by sea from a considerable distance. The French coal-fields do not yield, generally, a sufficient amount of carbonate of iron to render its extraction a matter of much profit, with the exception of the iron works of Decazenville, in the basin of Aveyron.

In relation to this ore is a fact worth the attention of our iron-masters: that ore which contains a small proportion of manganese—say from eight to twelve per cent.—is found to produce the best iron for making steel, while the presence of a larger per-centage of manganese is regarded as unfavorable. That a small proportion of manganese tends to liquify the slag is undoubtedly true; but what further use it can form it is hard to say.

The bisulphuret of iron, or iron pyrites, although never treated metallurgically for the metal it contains, and consequently, properly speaking, not an iron ore, is, nevertheless, an important mineral on account of the sulphur which it yields. Its component parts are 45.74 of iron and 54.26 of sulphur. It occurs in cubical crystals in slate-rocks and coal-fields. It frequently also accompanies the ores of other metals. Some crystals from the Isle of Elba, extremely large and beautiful, and presenting pentagonal dodecahedrons of four inches in diameter, were exhibited. From the Cornish mines and from Sweden some gigantic octahedrons were exhibited.

Antimony.—The ores of this metal, so far as their products become an article of commerce, are obtained from Schemnitz and Kremnitz, in Lower Hungary, and from the island of Borneo. Antimony in the market is obtained from the native sulphuret of antimony, often associated with ores of copper, silver, lead, zinc, and manganese. To obtain it in its crude state, the ore is placed in crucibles, having a hole at the bottom, and these are inserted in other vessels; heat is applied to the crucibles from above, and the ore, which melts from its gangue, flows down, and is collected in the pot beneath, wherever it becomes solid. By this treatment the ore is not altered in composition, but merely purified from the infusible substances with which it is associated.

To obtain pure antimony, the ore is carefully washed in a reverberatory furnace until it has become oxidized, and then this product is fused with some reducing agent—such as crude tartar. Antimony is largely used, when alloyed with lead and a little tin, in the manufacture of printers' type, for which it is eminently adapted, both on account of its fusibility and hardness, and also from the circumstances of its expanding in the mould at the moment of cooling.

Among the illustrations of this metal were some specimens of regulus of antimony from the Bistrons Smelting Works, in Hungary; three varieties of crude antimony from the works at Maegdesprung, in Saxony; sulphuret of antimony from the mines of Saragossa; and specimens of Montanto and Pereta, in the province of Grosseto, Tuscany.

Silver.—The silver produced in England is chiefly obtained by the treatment of the ores of lead. The silver of South America is princi-

pally derived from the horn silver, brittle silver, vitreous silver, and arsennuretted ores, as also, to a certain extent, from the native ores. The ores of Mexico are of a similar character.

In Mexico, the mines are most abundant in the back of the Cordilleras, between 18° and 24° north latitude. In Peru, the principal mines are in the districts of Pasco, Chota, and Huantaga.

The celebrated Potosi mines, in Buenos Ayres, occur in a mountain of argillaceous shale, whose summit is covered with a bed of porphyry. The ore is red silver, vitreous ore, and native silver.

In Europe, the principal mines are those of Spain, Norway, Saxony, Austria, and Russia. The silver of Spain is chiefly obtained from galena, and principally in the Sierra Almagrera, in Grenada.

In the Tyrol, the sulphuret of silver, argentiferous, grey copper, and misnickel, occurs in a gangue of quartz in argillaceous schist.

The Hungarian mines at Schemnitz and Kremnitz are in sycnnite and hornblende porphyry, in a gangue of quartz, often associated with cale spar of sulphate of barytes.

The Russian mines of Kolyvan, in the Davuria mountains, Siberia, are steadily increasing in value, and annually produce about 47,800 pounds of pure silver.

The common methods of reducing silver ore in the large way are two—by smelting and by amalgamation. When argentiferous galena in the mineral is operated upon, it is treated in a reverberatory furnace as an ordinary lead ore. To separate the silver from the lead, it is fused in the same kind of furnace, of which the hearth is composed of bone ash. A current of air is also admitted through a tuyere on one side of the apparatus, which, passing constantly over the surface of the fused metal, oxidizes it and converts it into litharge, which escapes through a proper channel prepared for that purpose. At the end of a certain time the whole of the lead is thus removed, and the silver remains in a state of almost perfect purity. The completion of the process is known by the metal becoming brilliant, and, on cooling, throwing out arborescent sprouts, resembling the branches of some kinds of coral.

According to Pattinson's new method, (now very generally adopted,) the silver is separated by melting the lead in large iron pans, and, as it begins to cool, straining out the crystal with a perforated iron ladle. From the greater fusibility of the alloy of lead and silver, the portion left behind contains nearly all the latter metal. This process being repeated several times in the same portion of alloy, it ultimately becomes very rich; and, when it contains from 300 to 400 ounces of silver to a ton of lead, it is exposed to a bone ash test.

Very beautiful models of a refining furnace, and a set of crystallizing pots, were exhibited by the Duke of Buccleugh. In their immediate vicinity was seen a drawing, together with a series of products, including a large plate of silver, by which Mr. Pattinson illustrated his process of enriching lead by crystallization. When amalgamation by mercury is employed, the silver ore is brought to a state of chloride by a mixture of the powdered ore with about 10 per cent. of common salt; the chloride formed is reduced by means of sulphuret of iron, or by iron filings, and, at the same time, the liberated silver combines with the mercury which has been added to the mixture. The amalgam, separated from the muddy mass by a current of water, or washing, is then filtered from the

excess of mercury, and, as a last step, is subjected to a strong heat in a distilling furnace, by which the silver is left behind, whilst the mercury passes off in the form of vapor, to be condensed in a large receiver, partially filled with water.

There were many rich specimens of argentiferous galena and other silver ores exhibited. Among the most remarkable of these were a large mass of native silver from Chili, and some very beautiful specimens of the same substance from Prince's Location, Lake Superior.

Mercury.—This metal occurs in the native state, alloyed with silver, and in combination with sulphur, chlorine, or iodine. Native mercury is rarely found, yet it is met with in greater or less quantities in various mines of that metal.

Cinnabar, the native sulphuret of mercury, is a dullish mineral of a reddish-brown or brownish-black color, and, when scratched, affords a red streak: when pure, it consists of 86.29 parts of mercury, and 13.71 parts of sulphur. This mineral, from which the principal part of the mercury of commerce is obtained, mostly occurs in connexion with talcose and argillaceous shales, but has also been sparingly found in granite. The principal mines are at Idria, in Austria; Almaden, in Spain; in the Palatinate, on the Rhine; and at Huanca Velica, in Peru. Mercury also occurs in Mexico, Hungary, Sweden, France, and Tuscany. Chloride of mercury, which is a tough, sectile ore, of a grey or yellowish color, is an extremely rare mineral, and does not occur in sufficient quantity to be metallurgically treated for the quicksilver which it contains.

The mines of Idria were discovered in the year 1497. The ore is obtained at the depth of 750 feet from the surface, and is mostly a bituminous cinnabar, disseminated through the well along with native mercury. In some parts of the vein this is so abundant, that when earthy rock is newly broken, large metallic globules flow out, and fall to the bottom of the gallery. After the native mercury has been separated by filtration, through a sieve, the mineral and its adhering gangue is washed and prepared for reduction. For this purpose a large circular building, 40 feet in diameter and 60 feet in height, is employed, which communicates, through numerous small openings, with a range of chambers disposed on either side. The building in the centre of the arrangement is filled with earthen pans, containing the prepared earth, and the whole is afterwards closed up, and the heat is gradually applied. The mercury sublimates and is condensed by the cold air of the smaller chambers, whence it is subsequently removed and packed into iron bottles. The mineral produce of these mines amounts to about 150 tons per annum.

The mines of the Palatinate, on the Rhine, and those of other parts of Germany, are said to yield 7,600 quintals per annum. Those of Almaden, situated near the frontier of Estremadura, in Spain, have been worked from remote antiquity without sensibly diminishing the yield. According to Pliny, they were worked by the Greeks seven hundred years before our era.

The mines at Huanca Velica, in Peru, have afforded a large amount of mercury for amalgamation at the Peruvian silver mines. Between the years 1590 and 1800, they are estimated to have produced 537,000 tons. Their present annual yield amounts to about 1,800 quintals.

The Chinese are stated to have mines in Sheusia, where the ore is reduced by the rude process of burning brushwood in rocks or pits dug out for that purpose, and then collecting the metal after condensation.

Few ores of mercury occur in Great Britain. In the foreign part of the building were several illustrations of the metallurgy of this important mineral. The inspector of mines of the district of Almeria, besides contributing various other minerals, sent some fine specimens of cinnabar. From the imperial mines of Vienna there were specimens of mercury and cinnabar, as well as samples of the same products from the mines of Idria.

Platinum.—This metal is usually found combined with more or less of the rare metals—palladium, rhodium, iridium, and osmium, besides variable quantities of copper and iron. It commonly occurs in flattened grains, and in angular, irregular masses, and was first detected in alluvial deposits in South America, whence it derived its name of platina, a diminutive of the word *plata*—meaning silver. It was discovered by Ulloa, a Spanish traveller in America, in the year 1735, and was made known in Europe in 1748. It has since that time been found in the Urals, in Borneo, in the sands of the Rhine, in St. Domingo, and in our own country. The Ural districts afford the chief portion of the platinum of commerce. It occurs there, as elsewhere, in alluvial beds; but the course of the platiniferous alluvium has been traced for a considerable distance up the mountains, consisting of crystalline rock, the evident origin of the detritus. From one to three pounds of platinum are procured from two tons of sand.

The infusibility of platinum, and its resistance to the action of air and water, and of most other agents, natural or chemical, render it of great value in the construction of chemical and philosophical apparatus. The large vessels employed in the manufacture of sulphuric acid are now made of platinum, which is entirely unaffected by this corrosive substance. It is also employed for crucibles and capsules, used in chemical analysis, for galvanic batteries, and it is worked into foil, drawn into wire, or fashioned into cups, which hold bodies heated in the blow pipe. It alloys readily with silver, lead, and several of the other metals, and it is also attacked by caustic potash and phosphoric acid, in contact with carbon; consequently, care must be taken, when treating it, that it be not exposed to the action of any of these substances. For many years after its discovery, platinum was, on account of the difficulty of obtaining it in masses, an almost useless metal. When strongly treated, the grains are readily welded together; but, from the smallness of the fragments, this causes interminable labor, and besides does not afford a pure metal. The process now generally adopted was first introduced by Dr. Wollaston, and consists in dissolving the native metal in hydrochloric acid, and then throwing down from the solution all orange-colored precipitate by means of muriate of ammonia. This precipitate, which is a double chloride of platinum and ammonia, is then heated and reduced to the metallic state, the platinum being then in an extreme minute state of division. This black powder, which is spongy platinum, is next compressed in steel moulds by the aid of heat and strong pressure, and when sufficiently compact, is forged under a hammer, by which it is ultimately reduced to a solid mass.

Among the illustrations of this metal were some admirably finished dishes and crucibles, exhibited by W. P. Johnson, of Hatton Garden, London; crude and manufactured platinum, by Wolf & Erbslok, Bremen; and a large platinum still, with sundry other articles from the same metal, in the French department.

Malachite.—This ore, called the green carbonate of copper, is remarkable for its fine emerald green color, of which the same specimen often exhibits a great variety of shades. It is sometimes found in a crystallized form, but more often occurs in radiated concretions and manipulated uniform masses, made up of several successive layers, of which the extent and thickness are readily apparent.

Malachite occurs in large quantities in the Ural mountains, and in the mines of Australia; in Cornwall, at Chessy, and at other places; and from its high per-centage of metal it is highly prized as an ore of copper, although such varieties as are sufficiently compact are more valuable for the purpose of being polished for ornament—such as snuff-boxes, broaches, or larger objects.

Russia exhibited in her department of the Exhibition the most wonderful works in malachite that have ever been known. The vases, fire-places, tables, side-boards, and stands made from this article, brought to its highest polish, attracted universal admiration. The ore, in the manufacture, is first sawed into slabs of three-quarters of an inch in thickness, which are ground and polished. These slabs, seldom of a size exceeding three inches in diameter, are then assorted with reference to similarity of color and the running direction of their veins. This done, the workmen then take the model to be veneered, and, arranging the pieces of ore to as near a match as possible, proceed to connect them to each other, and to the frame work which they are to cover. The chief skill of the work consists in an accurate adjustment of one piece with another, so that vein shall meet vein, and color color, in so perfect a manner, that the whole, when completed, may appear as one stone. In the doors of malachite, which were the largest and most costly productions of that material ever manufactured, the adjustment of the different pieces of metal had been accomplished in a manner so perfect that it was difficult to detect the lines of junction. Including bases and capitals, the whole height of these doors was twenty-three feet; their whole width, including mouldings, sixteen and a half feet. They had been first framed of solid oak, and then covered with a coating of brass. The malachite veneering was then cemented upon them, the mouldings being made of the solid ore. After the whole work had been completed, the process of polishing was commenced, and it is, perhaps, the best evidence of the inutility of the metal to any purposes but those of the highest luxury, that the workmen were engaged for three months in perfecting this finishing process. The cost of these doors was stated to have been £8,000 sterling.

Iron Products.

Perhaps the strongest impression made upon the mind of the intelligent observer, in his daily walks among the different nations represented in the Exhibition, was that derived from contrast. No better opportunity was ever afforded to learn how much of the improvement in the arts among mankind has arisen from a knowledge of the physical and chemical character of the materials employed in workmanship than was found here. The department of Sheffield, for example, where the highest perfection to which iron, as nature yields it, has been brought, was but a minute's walk from that of Tunis, in which gold, precious stones, and

elaborate carving were lavished upon utensils of the rudest construction. In the one case, inductive science had been long employed to give purity to the material used before it entered the workshops of the artificer; in the other, the vain struggling of rude minds to obtain a conquest over nature, was shown in the unchanged forms of the first combinations of the metal. The keen blade of the penknife or the razor, when compared with the Tunisian sabre, but little in advance (in material used) over the rude arrow-head of the North American Indian, furnished a striking example of what intellectual progress has accomplished for human industry.

With iron, as a metal, every one is familiar. As it is the most useful, so it is, of all the metals, that with which mankind are best acquainted. And yet, even while it is more extensively employed for the supply of human wants than all the other metallic productions of the earth, and while it has been made the subject of scientific investigation from the earliest ages, we are still ignorant of some of its most remarkable properties. Iron, hammered into shape from the pig metal under the intense heat of the forge, becomes fibrous, tough, and susceptible of being bent into almost any shape without breaking or cracking; and yet this same iron, placed as shafting in the cotton or woollen mill, where, in its constant revolution, it shall be subjected to continual jar, or made into the axletree of a railway carriage, and used upon the road, becomes so crystalline and short that it is easily broken, like stove castings, under the blow of the hammer. How many causes, besides vibration, go to produce this change in the structural arrangement of the particles of iron we do not know. The process of cooling iron of the highest quality, undoubtedly has great effect upon its condition, and sometimes renders it valueless as wrought iron. The continued hammering upon the anvil will produce also similar results.

The processes of converting pig into bar iron adopted in England, although bearing much resemblance to those in our own country, have still some points of difference, which cannot be without their importance. The machines adopted for forging and condensing wrought iron vary in form and in principle according to the ideas of the iron-master. The tilt-hammer is most commonly employed. The steam-hammer is, however, increasing in use. The blooms are brought under the hammer at a red heat, and beaten out into bars, at the rate of from 70 to 140 blows per minute, the force of the blow being according to the space described by the hammer. The old notion, that rollers would produce as good iron as the hammer, is now generally exploded. The extraneous portions of the metal are driven off by repeated blows; while under the rollers, they are mainly incorporated with the metal.

Railroad bars, of which great numbers were exhibited, may perhaps be regarded as a fair sample of the good bar-iron of England. Coarse, porous iron, of which more than three-quarters of the products of the English forges consist, does not make good bars; and hence the necessity of constant selection from the mass produced. Many bars were exhibited broken, for the purpose of showing their molecular structure, and to impress the importance of a tough and fibrous material.

The subject of mixing various qualities of iron together, and of mixing other metals with iron, has received of late much consideration. A process has recently been patented in Great Britain by which cast iron and wrought iron are associated, producing, it is said, a tougher metal. A

rail (broken to show the structure of the bar) of this mixed iron exhibits the fibrous or toughened tops, in cohesion with a crystalline centre. Mr. Morris Sterling, the patentee, exhibits also other metallic alloys, to show the changes which the molecular composition is capable of undergoing. Mr. Sterling considers the fluidity of Berlin iron to be due to arsenic; that phosphorus will produce the same result when mixed with any iron; that the presence of manganese with cast iron closes the grain, and is an improvement both to it and to steel; and that zinc and tin, mixed with iron, are capable of greatly changing and improving its qualities. By the addition of calamine to common iron, a very superior malleable iron is produced. On the character of these, and other alloys, Mr. Sterling writes as follows, viz:

“The wrought iron, made either from the toughened cast or by the admixture of calamine, is particularly useful for tension rods, chain cables, &c. The addition of antimony, and some other metals, to wrought iron in the puddling furnace, gives a hard and crystalline iron, nearly allied to steel in some of its properties, and is adapted, from its hardness and crystalline character, to form the upper part of railway rails, and the outer surface of wheels. When thus united to the iron containing zinc, the best sort of rail results, combining strength, stiffness, and hardness, with anti-laminating properties, and being also cheaper than any other kind of hardened rail or tire.

Compounds of copper, iron, and zinc are found to be much closer in texture, and stronger, than similar compounds of copper and zinc, (the proportion of iron not usually exceeding one and a half per cent.,) and can be advantageously used as substitutes for gun-metal, under all circumstances—for great guns, screws, propellers, mill brasses, and railway bearings. Small additions of tin, and other metals, alter the character of these compounds, and render them extremely manageable as regards hardness and stiffness. The advantages which these compounds possess over gun-metal are cheapness and increased strength, being about one-fourth cheaper, and one-half stronger, and wearing much longer under friction. On many railways the alloys of zinc, copper, tin, &c., have superseded gun-metal for carriage bearings. An alloy equal in tone to bell metal—cheaper, and at the same time stronger—is made from the alloy of copper, zinc, and iron, a certain proportion of tin being added. The addition of iron seems, under most, if not all circumstances, to alter the texture of metallic alloys, rendering it closer, and the alloys, therefore, more susceptible of a high polish, and less liable to corrosion. Other alloys of iron were exhibited—some showing the extreme closeness of texture; others possessing very great hardness, and suitable for tools, cutting instruments, &c.; others possessing a high degree of sonorousness.

The firmness of grain, and compactness of structure, which characterize various samples of iron contained in the Swedish, Spanish, and Austrian department, very strongly resemble the copake iron, made by the Messrs. Pomeroy, of Pittsfield, Massachusetts, which is used by the United States government at the armories. Both, or all these, owe their evenness of texture not to accident or design; for it is the invariable attribute of charcoal iron. It is wanting, however, in all iron made by coke or coal, which just as invariably possesses a rough, hackley grain, and a crystalline structure. In regard to British iron, it has been suggested that this arises from a minute quantity of impurity in the ore. That

there is some truth in this cannot be doubted, since no process can ever render iron which is made from certain ores of a superior class. Yet too much weight must not be given to this as the cause of difference in iron, since chemical analysis barely permits, but does not strengthen, the suggestion. Are we not, then, justified in looking for other explanations, especially when the wondrous changes induced by an altered molecular arrangement of particles are duly considered? Some time ago, a patent was secured in England by a Mr. Heath, for the introduction of a small portion of carburet of manganese into the melting pot with cast-steel; and the result of this is, that steel so melted in contact with manganese will weld either to itself or common iron. Yet the most careful chemical investigations have failed to prove the existence of manganese in steel melted after Mr. Heath's method. Again, pure copper from the refinery is highly crystalline, and incapable of being rolled or hammered into plates, unless it has undergone the mysterious process called "polling;" after which, its crystalline character vanishes, and it may be beaten into thin plates or leaves. Now, in all probability, the conditions which lead to the crystallization of copper also tend to produce those of iron; and hence, instead of sitting with folded hands, under a belief that the brittleness of coal-made iron is irremediable, practical men, in Pennsylvania and other coal-iron producing States, should be on the alert to discover a mode which, like the polling of copper, may answer the end, though incapable of scientific explanation. It is said that splendid fibrous iron is occasionally produced in the forges of England as a work of accident; but in nature there is no such thing as chance. Few inventions of modern date would so largely repay a discoverer as this; and there is no doubt that the cure for coal-made iron, when found, will prove an extremely simple and easy affair.

Another subject, closely allied to this, deserves notice, to which we have briefly alluded before: Does the substance of iron which has been for a long time exposed to percussions and vibrations undergo any change in the arrangement of its particles, by which it becomes weakened? A great difference of opinion exists among practical men with respect to this question. Many curious facts have been elicited, which show that pieces of wrought iron that have been exposed to vibration—such as the axles of railway carriages, the chains of cranes, &c., employed in raising heavy weights—frequently break after long use, and exhibit a peculiar crystalline fracture, and loss of tenacity, which is considered by some engineers to be the result of a gradual change, produced in the internal structure of the metal by the vibrations. In confirmation of this, various facts have been adduced—as, for instance, if a good piece of fibrous iron have the thread of a screw cut upon one end of it by the usual process of tapping, which is always accompanied by much vibratory action, and if the bar be then broken across, it will be found that the tapped part is a good deal more crystalline than the other portion of the bar. Others contend that this peculiar structure is the result of an original fault in the process of manufacture, and deny this effect of vibration altogether; whilst some allege that the crystalline structure can be imparted to fibrous iron in various ways—as by repeatedly heating a bar, red hot, and plunging it into cold water, or by continually hammering it, when cold, for half an hour or more.

Mr. Brunell, however, thinks the various appearances of the fracture depend much upon the mode in which the iron is broken. The same piece of iron may be made to exhibit a fibrous fracture when broken by a slow, heavy blow, and a crystalline fracture when broken by a sharp, short blow. Temperature alone has also a decided effect upon the fracture: iron broken in a cold state shows a more crystalline fracture than the same iron warmed a little.

The commissioners appointed to inquire into the application of iron to railway structures examined this question experimentally, in a variety of ways. A bar of cast iron, eight inches square, was placed on supports, about fourteen feet asunder. A heavy ball was suspended by a wire eighteen feet long from the roof, so as to touch the centre of the side of the bar. By drawing this ball out of the vertical position at right angles to the length of the bar, in the manner of a pendulum, to any required distance, and suddenly releasing it, it could be made to strike a horizontal blow upon the bar; the magnitude of which could be regulated at pleasure, either by varying the size of the ball or the distance from which it was released.

Various bars (some of smaller size than the above) were subjected to successions of blows, numbering, in most cases, as many as 4,100; the magnitude of the blow, in each set of experiments, being made greater or smaller, as occasion required. The general result obtained was, that when the blow was powerful enough to bend the bars through one-half of their ultimate deflection, (that is to say, the deflection which corresponds to their fracture by dead pressure,) no bar was able to stand 4,000 of such blows in succession; but all the bars (when sound) resisted the effects of 4,000 blows, each bending them through one third of their ultimate deflection.

Other cast-iron bars, of similar dimensions, were subjected to the action of a revolving cane, driven by a steam engine. By this they were quietly depressed in the centre, and allowed to restore themselves; the process being continued to the extent of a hundred thousand successive periodic depressions for each bar, and at a rate of about four per minute. Another contrivance was tried, by which the whole bar was also, during the depression, thrown into a violent tremor.

The results of these experiments were, that when the depression was equal to one third of the ultimate deflection, the bars were not weakened. This was ascertained by breaking them in the usual manner by stationary loads in the centre. When, however, the depressions produced by the machine were made equal to one-half of the ultimate deflection, the bars were actually broken by less than nine hundred depressions. The result corresponds with and confirms the former.

By other machinery a weight, equal to one-half of the breaking weight, was slowly and continually dragged backwards and forwards from one end to the other of a bar of similar dimensions to the above. A sound bar was not apparently weakened by ninety-six thousand transits of the weight.

It may, on the whole, therefore, be said that, as far as the effects of reiterated flexure are concerned, cast-iron beams should be so proportioned as scarcely to suffer a deflection.

In wrought-iron bars no very perceptible effect was produced by 10,100 successive deflections by means of a revolving cane; each deflec-

tion being due to half the weight which, when applied statically, produced a large permanent flexure.

Precious Stones.—Among the minerals employed for personal decoration the diamond occupies the first position, both on account of the beauty of the gem itself and from its commercial value. The diamond, like charcoal, is composed of carbon, and, in a chemical point of view, differs from it only in being perfectly free from all traces of the earthy and other impurities with which the other substance, even when most carefully prepared, is to a considerable extent contaminated. This mineral, although principally used in ornamental jewelry, is likewise applicable to many other purposes. In consequence of its extreme hardness, it is now extensively employed for making the pivot holes of the better description of watches; it has also been used in the formation of holes through which very fine metallic wires are made to pass, besides furnishing the only convenient tool which can be employed for cutting glass.

The countries in which this gem has yet been discovered are far from numerous, the only localities in which it has been found being the Indian peninsula, Brazil, the Island of Borneo, and Siberia, on the western side of the Ural mountains. Its geological position appears to be among diluvial gravel and conglomerate rocks, or pudding stone, consisting chiefly of rolled flint pebbles and ferruginous sand.

India has, from the most remote ages, been celebrated for the beauty and magnitude of its diamonds, the largest and most valuable of which are obtained from the mines in the provinces of Golconda and Visapoor. The tract of country producing these gems extends from Cape Comorin to Bengal, and lies at the foot of a chain of mountains called the Orixas, which appear to belong to the Trap Rock formation. The diamonds obtained from even the richest localities are rarely procured by directly searching the strata in which they are found, since they are commonly so coated with an earthy crust on the outside as not to be readily distinguishable from the various other substances with which they are associated. For this reason the stony matter is first broken into fragments, and then washed in basins, for the purpose of separating the loose earth; after which the residual gravel is spread out on a level piece of ground, where it is allowed to dry, and where the diamonds are recognised by their sparkling in the sun—thus enabling the miners readily to discriminate between them and the stony matter with which they are associated.

The chief diamond mines of Brazil were discovered in the year 1728. The ground in which they are embedded exactly resembles that of the diamond districts of India, and, besides containing fragments of colored quartz and ferruginous sand, it produces small quantities of gold in connexion with oligist iron ore. This conglomerate or pudding stone, which is seldom of any great thickness, occurs at considerable heights in the mountainous table lands, and is entirely different from all the other mineral productions which are to be found in the vicinity.

The principal mine of this part of the world is that of Mandagra, north of the Rio Janeiro, where the gems are obtained from the sand taken from the bed of the stream, after laying it nearly dry by drawing off the water, during the dry seasons, into large reservoirs prepared for that purpose. The “cascalho,” or diamond gravel, which is then removed, is then afterwards formed into little heaps, or mounds, of 15 or

16 tons each, where it remains until the commencement of the rainy season, when it is carefully washed in large square boxes arranged under large oblong wooden sheds. A negro washer works at each of these boxes, and numerous inspectors are placed at regular distances among the workmen to prevent any abstraction of the diamonds by those who may chance to find them. When a negro finds a diamond he immediately shows it to the inspector, and if its weight amounts to $17\frac{1}{2}$ carats, or 70 grains, he receives his liberty.

The diamond is found crystallized in the octahedron form, or in some other immediately derived from it. Its specific gravity varies from 3.4 to 3.6. It is not acted upon by any solvent; but when strongly heated in air, or in oxygen gas, is consumed with the formation of carbonic acid.

The fracture of this mineral is foliated, its laminæ being parallel to the faces of the regular octahedron. When broken, it divides in the direction of these lines; and this property of the gem is extensively taken advantage of by the lapidary when reducing it to the forms best adapted to ornamental purposes.

Diamonds are usually colorless and transparent, but, when colored, are usually of a yellowish tint. Green diamonds are, next to yellow, the most common. Blue specimens are also occasionally found, and, although they seldom possess much lustre, are in many countries highly valued.

Of all the colored varieties the rose or pink diamond are, however, by far the most esteemed, and sometimes even exceed in value those which are perfectly colorless, although, in general, the most limpid gems will be found to bear the highest price.

The art of cutting and polishing the diamond, although probably known in Asia in remote antiquity, was first introduced into Europe by Louis Bergher, of Bruges, in the year 1456. The object is effected in two different ways, either by taking advantage of the natural laminæ of the gem, and splitting it in directions parallel to the faces of the octahedron, or by sawing it with a very delicate wire covered with diamond powder. By these processes, and more especially by the former, the diamond is so cut away that the weight of the finished gem is rarely more than one-half that of the rough stone from which it is cut; and consequently the weight of the brilliant cut diamond is considered equal in value to that of a similar rough one of twice its weight, exclusive of the cost of labor expended in the workmanship. The weight and value of diamonds are estimated in carats, of which 150 are equal to one ounce troy, or 480 grains.

The difference between the exchangeable value of two diamonds of equal merit is generally estimated in the squares of their weights, so that the value of three diamonds, weighing, respectively, one, two, and three carats, will be as one, four, and nine.

The average price of rough diamonds is estimated at £2 per carat; and consequently, when cut, the cost of the first carat, exclusive of workmanship, will be £8, which is the price of an uncut diamond of two carats.

The rapidly increasing value of diamonds in proportion to their weight in carats will be readily seen by a glance at the following tabular statements:

A wrought diamond of 3 carats is worth	-	-	-	£72
Do do 4 do	-	-	-	126
Do do 5 do	-	-	-	200
Do do 10 do	-	-	-	800
Do do 20 do	-	-	-	3,200
Do do 30 do	-	-	-	7,200
Do do 40 do	-	-	-	12,800
Do do 50 do	-	-	-	20,000
Do do 60 do	-	-	-	28,000
Do do 100 do	-	-	-	80,000

Beyond this weight such a method of calculation is not, however, applicable, in consequence of the difficulty of finding purchasers for the more valuable gems.

Of the numerous diamonds exhibited, by far the largest and most valuable is the Koh-i-noor, formerly the property of Runjeet Singh. This jewel, which is the property of her Majesty, is one of the largest in the world, and is valued at £2,000,000 sterling. Besides this magnificent diamond the Exhibition contains a vast collection of jewels of inferior weight and value, among which may be mentioned a unique blue diamond weighing 177 grains, the property of Mr. Hope.

Of the other large diamonds in the world, the following are the most remarkable: That mentioned by Tavernier as belonging to the Emperor of Mogul, a now extinct kingdom, weighing, in the rough state, 900 carats. It was found in the Golconda mine in the year 1550, and is the size of a hen's egg divided through the middle in the direction of its smallest diameter. Among the crown jewels of Russia is a diamond weighing 195 carats. It is the size of a pigeon's egg, and was formerly the eye of the idol Sheringham. Thence it was stolen by a French soldier who deserted in the Malabar service, and who found the means of purloining the gem. He escaped with it to Madras, where he disposed of it for £2,100 to a captain of a ship, who afterwards sold it to a Jew for six times that amount. The Jew subsequently disposed of it to a Greek merchant, who afterwards sold it to the Empress Catharine for £90,000 in ready money and an annuity of £4,000. The most perfect and beautiful diamond hitherto found is probably that brought from India by an English gentleman of the name of Pitt, who sold it to the Duke of Orleans, by whom it was placed among the crown jewels of France. This jewel weighs rather more than 136 carats, and was sold for the sum of £100,000.

A model of a portion of the Nizam diamond—the remainder being unfortunately chipped off—is shown in the Indian department. The manner in which this diamond was found, about 20 years since, in the Nizam's territories, is rather interesting. It was first seen in the hands of a native child, who was playing with it in ignorance of its value. The sum of eight "aunas" being offered for it, excited the suspicion of the parents of the child, and led ultimately to the discovery that the bright stone was a real diamond. The diamond, after passing through many hands, was purchased by a native banker for 70,000 rupees, and it is now in the possession of his highness the Nizam. The stone is of an irregular, oval shape. Its length is 2.48, its greatest breadth 1.85, and its average thickness 0.92 inch. The actual weight of the Nizam

diamond is 1,108 grains, being equal to 277 carats of weight for the rough diamond; and as the rough stones are usually taken to give but one-half their weight when cut and polished, we should have $108\frac{1}{2}$ carats; or a weight between the Pitt or Regent diamond ($186\frac{3}{4}$ carats) and that of the Grand Duke of Tuscany, (139 carats,) and the weight of the Nizam diamond. Had the diamond remained entire, its weight, when cut and polished, would have been $155\frac{3}{4}$ carats, which would have placed it between the Tuscan and the great Russian diamond of 195 carats.

From the circumstances of the Nizam diamond not being polished, it is not known whether it is likely to prove one of the first water; but there is every probability that it is so, as the natives of India are too good judges of diamonds to mistake a topaz for one. And an additional proof of its value may be learned from the fact that a native gave, for the broken fragment, a sum not less than 75,000 rupees.

The diamonds coming from Brazil are usually smaller than those procured from India. But the mines of the former country annually furnish from 10 pounds to 13 pounds weight of this precious mineral, of which from 800 to 900 carats only are fit for jewelry; the remainder, under the name of "port," being used for other purposes—such as the cutting of glass and the grinding or polishing of precious stones.

Among the other minerals much prized by the jeweller may be mentioned the sapphire, which, when perfectly transparent, and of a good color, is as highly esteemed as the diamond. This gem is almost entirely composed of alumina, the various colors of different individual specimens being occasioned by extremely minute admixtures of the metallic oxides. Those having a blue color are known as oriental sapphires, whilst others not having the same oxides in combination are differently colored, and consequently receive various distinct names. When red, they are called oriental rubies; when yellow, oriental topazes; when violet, oriental amethysts; and when they are hair brown, adamantine spar.

The finest blue specimens of this gem have been procured from Ceylon. The most esteemed red varieties come from the Capellan mountains, in the kingdom of Ava; and smaller stones of the same kind are occasionally met with in Saxony, Bohemia, and Auvergne. Amethysts are principally brought from the Carnatic or the Malabar coast, and elsewhere in the East Indies. The adamantine spar is chiefly obtained from the Malabar coast, but is less used than the other varieties for ornamental purposes. Of these several kinds the red is by far the most valuable—a ruby of $3\frac{1}{2}$ carats, and perfect in form and color, having been valued at the same price as brilliants having an equal weight.

The emerald is a precious stone, of a beautifully green color, valued next to the diamond, and in the same rank as the oriental ruby and sapphire. It occurs crystallized in regular six-sided prisms, and has a specific gravity of 2.70. In composition this gem may be considered as a double silicate of alumina and glucina, mixed with variable small portions of iron and a little lime. The most beautiful emeralds are obtained from Peru, where they occur as a kind of grey schist, mixed with greater or less quantities of carbonate of lime. A good stone of this kind, weighing four grains, is valued at from £4 to £5; and one of 24 grains realized, at the sale of M. De Dree's cabinet, 2,400*fr.*, or nearly £100.

The garnet is a vitreous mineral, belonging to the cubic system, and of which the predominating form is the rhomboidal dodechaedron. Its

constituents are silica, alumina, lime, and protoxide of iron. It is usually found discriminated in the primitive formations, and frequently occurs in gneiss and clay slate. Garnets are abundantly met with in many parts of Europe, particularly in Germany; but those of Peru are the most esteemed.

The crysolite, called the "peridot" by Haug and the French mineralogists, is, probably, the topaz of the ancients. It is the softest of the precious stones, being scratched by a file or a fragment of quartz. Quartz, in a crystalline form, is also frequently cut for ornamental purposes; and when limpid and entirely free from flaws, is a very beautiful stone. When existing in the form of calcedony, and variously colored by metallic oxides, the substance receives the name of cats-eye, plasma, chrysopase, onyx, sardonyx, &c. It has a vitreous lustre, a conchoidal fracture, and a specific gravity of 2.69.

Opal, or uncleavable quartz, has a conchoidal fracture, with a resinous or vitreous lustre, accompanied by a strong play of colors. It occurs in kidney-shaped or stalactitic concretions, and has a specific gravity of 2.091. Hungary was long the only locality of precious opal, where it occurs in connexion with common opal, in a sort of phephyritis formation. Lately, however, some very fine specimens of this substance have been discovered in the Faroe islands; and most beautiful ones, sometimes quite transparent, are obtained near Gracias a Dios, in the province of Honduras, in America.

Electro-Metallurgy.

It is scarcely eleven years since electricity began to be applied successfully to the arts. About the year 1840, electro medals, brittle and friable, but still successful repetitions of the originals, began to pass into circulation. Since that period, the laws regulating the deposition of the metal have been determined, the most appropriate solution for every metal has been learned, and the operation of electrotyping has been dignified into an art. In all electro-decompositions the metal is deposited atom by atom, so that however minute the object is, however fine the workmanship, the difficulty of its application is in no way enhanced. Everything is faithfully copied, and our countryman, Professor Silliman, has actually been enabled to multiply the iridescent colors which gives its unequalled beauty to mother-of-pearl. In fact, there seems to be no bounds to the power of delicately representing objects by this wonderful process. Bunches of grapes, leaves of the fern, the tiniest spires shooting from a blade of grass, the stamens and pistils of flowers, wings of insects, down of feathers, and even the eyes of the common house-fly, are produced in model without difficulty, and in exquisite perfection.

The mode in which these results are obtained is generally that which is called the battery process; troughs and batteries of such as were employed in the usual *modus operandi* being exhibited at various stands in the Exhibition. In this trough gold and silver have latterly been reduced by the motion of the electric force. During this reduction of metals, various processes are simultaneously conducted. At the negative pole, when the metal is being deposited, the same amount of metal is produced from the solution. But at the same time that the metal is being reduced from the fluid, a similar amount of metal is dissolving at

the positive pole, and thus the precipitating trough is a manufactory for the generation of the metallic salt, and a decomposing apparatus for the reduction of the metal. With regard to gold and silver, which are generally precipitated from cyanides, more metal is apt to be reduced than that which is dissolved; and hence experimenters have thought that electricity has made gold.

In the rear of the Exhibition was placed one most interesting example of electro-metallurgic deposition. It was a complete model of the Britannia bridge, which has rendered the Menai straits so great an object of attraction. Every part of the model was made to scale, every rivet was represented, every smallest portion of iron, steel, casting, or wrought work, was depicted; and the tubes, exact in their reduced proportions, were placed as they were on the day when science achieved their successful fixture over the deep abyss.

The English ordnance department at Southampton exhibited some capital samples of electrotyped plates. After the plates are engraved, the next process is to form a matrix, which is kept for the purpose of producing as many other duplicate plates as may be required. The plan thus carried out is as follows: The battery trough is an immense tank, sufficient to hold enough fluid to charge the batteries for twelve months. The zinc plate is arranged in the middle, and plates of the best Sheffield plated copper are used for the negative pole. The back and cypreous edge are thoroughly coated with varnish, and the silver surface is covered with finely divided platinum. This form of battery answers well in the hands of the highly disciplined and effective corps of sappers and miners, but most other manufacturers find that a platinum silver plate, although much dearer, is still preferable to the platinized plated copper. The precipitating trough is placed upon a truck. The positive pole consists of a thick plate of copper, which is arranged at the bottom of the trough. The plate to be copied is placed at the top of the vessel, to prevent particles of dirt from falling upon it, and the proper diffusion of the newly-made metallic salts is obtained by a mechanical arrangement which agitates the whole vessel. The plates exhibited were seven in number—the first three being an original, duplicate, and matrix, to illustrate the manner in which corrections, surveys, new lines of railroad, or new buildings, were inserted without injury or alteration to the original. An impression on paper accompanies the original, showing its state before the matrix was taken.

In the department of the Austrian Imperial Printing Office was an electro deposit thirty feet long, to demonstrate the extent to which these deposits may be made. This was, a short time since, described in the *Philosophical Magazine*, and was afterwards carried out in England. In another department of Austria an invention was shown called chemi-typy, said to have been discovered by Püll, of Copenhagen. A zinc plate is taken and covered with etching ground; it is then etched, and the surface covered with an easy fusible metal. The plate is then scraped, so as to leave the metal in the hollow parts produced by the etching. The surface is then again etched to revise the part of the zinc plate for the elevation of the design; it is then, like a wood cut, fit for printing.

In the Denmark department was an example of electro-stylography. A cast is made in a black compound, which is silvered over. This is

drawn upon by cutting through the silver. An electro *reverse* is then made, and an electro-plate from this reverse, which is ready for printing. This is called electro-stylography.

It is a singular fact that the first idea of electro gilding was given by Brugnatelli nearly fifty years ago; and he states in a letter to Van Mons, which was published at the same time in most of the countries of Europe, that he had gilded two vessels by making them the negative pole of a voltaic circuit. Notwithstanding this publication, the old mercury gilding was carried out till the first idea of electro metallurgy had been given. To Elkington is due the merit of employing the compound of metal with the cyanide of potassium, which has afforded to the electro-gilder and the electro-plater such facilities that these processes can be employed by any person. The gilding or silvering solutions can be easily made by boiling the acids of the metals in a solution of the cyanide of potassium, or by a process which is more used by some manufacturers—that of making a large plate of pure metal the positive pole of the solution. In comparing the results which have been obtained by different manufacturers, it appears that a very thin layer will give as good an appearance to the eye as a very thick coating. Hence in buying these articles the purchaser must rely entirely upon the honesty of the manufacturer.

Electro-plating is undoubtedly made to subserve the purposes of false coinage. We ourselves have seen electro-plated sixpences, shillings, and half crowns in England which rung as clear as silver. They may always be detected, however, by the bitter taste of the cyanide which is always left in small quantities on the coin; by their lightness, nearly one-third less in weight than the original metal; and by being much more easily bent.

Electro statues were well represented in the Exhibition. The electro deposition of the head of Baron Macketti's horse was, perhaps, the best example. The electro statue of the Duke of Gloucester, modelled by Westmacott for the English House of Lords, by Elkington, was a most excellent electro-cast, and was by many considered the best thing in its way in the Exhibition. The Death of a Welch prince, supported by a female figure, a bust of Jupiter, a side-board with electro-bronze panels, and figures of Ariadne and the Fawn, all exhibited by Elkington, were very fine. In the hands of this firm (Messrs. Elkington) the manufacture of electro-plated goods promises to form a very important branch of industry. They are employing 750 hands in the production of these goods, have two large factories at work in Birmingham, and another in the process of erection, and are bringing steam power to bear upon their extended processes.

Prussia exhibited one small electro statue, admirably well done. The process of making electro statues, however, is expensive. We must first have the cost of the copper, to which must be added the cost of the zinc dissolved in the battery, and to these the cost of the sulphuric acid to dissolve it. Further, the moulds are expensive, and the labor difficult. In spite of all these charges, electro-metallurgy is increasing, even for electro statues. Some of the zinc statues of Kiss, the great artist of the age, are electro-coppered; but the plan he adopts he has not made known.

Electro bas-reliefs are said to be less difficult. They are well represented now in the bazaars and toy-shops of our country. Electro copper

tubes have also been produced, but they are said to fail in the purposes for which they were designed. Well represented as were electro-metal-lurgic specimens in the Exhibition, and extensively as the process has been introduced in the arts, there are many modes and applications known to the scientific which have not yet been adopted by the manufacturer. In the machinery department was exhibited a wood electro-magnetic engine, invented by M. J. Hjorth, of which a word should be said. The improvements consist in using only one hollow electric magnet, the respective poles of which are divided into three or more square rings, inside slightly conical, and outside connected with the bows of the magnet, which form the communication between the respective poles. Plates with ribs, connected in the centre with corresponding magnetic plates and ribs, are applied for guiding the motion of the piston, serving at the same time as a means by which metallic contact may, during each stroke, be established and broken between the piston and one of the respective poles. Whilst the engine makes a down stroke, magnetic contact is established between the north pole and piston; and the latter, obtaining thereby the same polarity as the north pole, will, of course, attract the south pole. By means of these and other arrangements, Mr. Hjorth is enabled to obtain a stroke of any length with only one electro magnet, the piston being a movable extension of either of the poles, and attracted by a succession of polarities, the acting surfaces of which extend to the whole periphery; and also to arrange the piston in such a manner that it may be extended to any size, and at the same time not be heavier than a piston in a low pressure engine of the same diameter.

Substances used as Food, and in Manufactures.

Food.—Among the most interesting and valuable of the series of articles exhibited under the head of substances used as food, not one surpassed the very fine collection of the Messrs. Lawson, of Edinburgh. It might be described as being a complete encyclopædia of the agricultural produce of Great Britain. The specimens were numerous, well selected, and admirably arranged, and they richly repaid a careful and minute examination. They were divided into six series, well arranged in cases, and were briefly described by labels. The first division included wheat and all the common cereals; in fact, all those plants which are cultivated for the sake of their farinaceous seeds. The seeds, in most cases, were accompanied with portions of the flour, both in the raw state and also manufactured into biscuits. The straw of each plant was also shown. The several divisions contained grass of all sorts, herbage, and forage plants. The third included all the plants which are cultivated for the sake of their roots—such as turnips, beets, carrots, &c. Of these the seeds, dried beans, and excellent models in wax, as well as colored drawings of the roots, were shown. The fourth and fifth divisions consisted of plants cultivated for the use of manufactures and for medicines, including, of course, the various fibre-yielding plants, and also those which yield dyes. In the case of the latter, not only were the seed and dry plant shown, but also the part used as a dye, together with good specimens of cloth and other fabrics dyed with it, giving, therefore, a most complete illustration of its practical use. In the last division were placed characteristic specimens of a great number of timber trees, consisting of

woods, leaves, fruits, and seeds. The specimens of leaves were especially beautiful and well selected, being for the most part sections of large trees, cut either horizontally or longitudinally, and in part polished, so as to show the grain.

Next in extent to the collection of the Messrs. Lawson was a collection of seeds exhibited by the Messrs. Gibbs. Part of this series consisted of fodder grasses, the dried plant being shown in each division of the cases by the size of the seed. A very valuable and complete series of wheat was contributed by Colonel Le Conteur, of Jersey. Near these were also samples of hybridized wheats, exhibited by Mr. Maund, of Bromsgrove.

Almost every country exhibited samples of wheat, barley, oats, and the ordinary cereals which are cultivated as articles of food. To attempt to specify these would lead us into too minute details for this Report. Many samples of new kinds of wheat were taken from the specimens shown in France, England, Russia, Spain, North Germany, &c., &c., to be tried in our own soil.

As a whole, the seeds (especially of wheat) from the United States were deemed superior to all others, and were greatly sought after. Mr. T. Bell, of Morrisania, New York, prepared and packed large samples of all his farm products—spring wheat, Soule wheat, Mediterranean wheat, bald white flint wheat, barley, rye, buckwheat, oats, maize, broom-corn, flax, millet, clover, and timothy seeds, which he freely distributed to the agriculturists of all nations. Of the new kinds of wheat exhibited, I doubt if many will be found useful to introduce upon our lands. The black wheat of the Burmese, and the soft white wheat of India, have each their own share of interest, though, from their being greatly subject to the weevil, I doubt if they would prove of any advantage to us. Col. B. P. Johnson, commissioner from the State of New York to the Exhibition, gave the subject of grains particular attention, and his report upon that and kindred subjects will not fail to be interesting and useful to our farmers.

Wools.—The collection of wools was by no means large. England, Scotland, and some of the northern islands, exhibited specimens of the South Down, merino, and Cheviot. Most of them were of a second-rate character, harsh, weak, and coarse. It must not be forgotten, however, that in England the rage for fine wool has never, as in the United States, depreciated the size and mutton of the flocks. The *fine* wools are not the produce of England. The farmer raises sheep for mutton, and the wool he takes from his flock is the gain upon which he counts. Still, there are crosses of breeds of sheep in England—such, for example, as the Leicester with the South Down—which produce good wool without deteriorating the market value of the carcass. Many of our agriculturists are now turning their attention to the English breeds of sheep. Fine ewes and bucks, purchased at a high price, have been imported during the summer, and many more have been ordered for another season.

In the departments devoted to the colonies of Great Britain many samples of wool were shown. From the Cape of Good Hope there were capital samples of Saxony; from Australia a clean wool, under the name of white skin wool, seemingly a cross between the merino and some native breed; from the East, Thibet wools, Hindostan wools,

Malay wools, and others; and from Port Philip a wool recently introduced into England, fine, strong, clean, with a long curling staple, and a weight of nearly four pounds to the fleece. There were wools shown, also, from South America; from Hungary—fine, but very greasy; from Vienna the best—whether in quality, strength, weight, or condition—of any in the Exhibition; from Bohemia—a pure merino; and from Silesia. The wool, however, most deserving the attention of our growers came from Prussia, contributed by M. Thaer, Moeglin, all native fleeces, and combining the desirable qualities for our western States. The sheep is represented to be large, hardy, easily fatted, and producing good mutton; not subject to disease, and yielding a long staple, strong and fine, wool, in weight to each fleece of over four pounds. Another very good quality of these native Prussian sheep is that the wool, uniformly good over all the skin, is equally covered upon it; thus, doubtless, accounting for the great average weight of the fleece.

The specimens of wool from our own country were confined to some three or four samples. Through the influence of Judge Duncan, of Virginia, these samples received the full attention of the jury, of which he was a member, and in the verdict were favorably noticed. Spain has become so associated with good wools that one expected, upon entering her division, to find a large collection. It was, therefore, disappointing to find but few, and those, for the most part, decidedly inferior. It would appear that, during the present century, when great improvements in the breeds of sheep have taken place over all the world, Spain alone has stood still, if, indeed, she has not sensibly retrograded. I may here state, with reference to this subject, that in former times the Castilian monarchs granted very peculiar privileges to the great sheep farmers, who were, in fact, the chief nobles of the land, and the heads of the principal religious establishment, and who were united together into a society which met at Madrid, from time to time, under the name of *Consejo de Mesta*. This society had supreme power in all matters relating to sheep, pastures, shepherds, and wool; and, amongst other important privileges, they had the right of pasturing their sheep on the lands of any farmer on payment of a small fine, or tribute; they were, in short, allowed to feed their sheep at the public expense. All this, however, has been long since done away with.

The French collection of wool was not numerous; but some of the fleeces shown were highly curious and interesting. The ordinary French wools of commerce are not at all peculiar, and, for the most part—including a small number of rather indifferent specimens from Algeria—there was little in them to deserve notice. It will, therefore, be enough to indicate those which possessed more than common interest. The most curious fleece exhibited in that division was unquestionably a variety of merino from the farm of M. Graux, at Hauchamp. This was an improved modification of the old Spanish stock, which, by careful selection and judicious care in breeding, has become a permanent variety, exhibiting no tendency to degenerate. The wool was thick upon the skin, long, remarkably brilliant, and very strong. It was a very fine and beautiful fibre, and one which is, as yet, unknown to our woollen manufacturers. Close by this fleece, and contrasting very curiously with it, were some fleeces of pure old merino breeds, which had been bred in and in, without any change or variation, for a long

series of years. They showed to what extent a good breed may be impoverished, though doubtless sent for a very different purpose. There were also fleeces from the national establishment at Rambouillet, fine, but of a short staple, and not well grown over the whole skin.

Cotton.—Perhaps one of the most important questions necessarily arising out of the Exhibition was, as to what extent any one country was to continue in the future to enjoy the monopoly in producing certain staple commodities. This question—of no inconsiderable interest when it concerned the articles of tea, sugar, tobacco, opium, rice, and cochineal—became of exceeding importance when applied to the future production of cotton, at the same time, when regarded in all its bearings, perhaps the most intrinsically valuable raw material in the world. To Great Britain, and all the other manufacturing countries of Europe, this question was of hardly less importance than to the United States, since, while to us the rise and fall of prices in cotton become the index of all other trade, to them it is the source from which a great portion of their industry derives its life. Those who are not in the habit of reading trade lists will have some idea of the importance of the cotton crops to the English manufacturers alone, from the fact that we export to England every year a quantity of cotton varying from a million and a quarter to a million and a half of bales, each bale weighing not far from 380 pounds; consequently, even at the lowest estimate, the annual business between us in cotton alone exceeds the enormous quantity of 470,000,000 pounds. As this export is constantly increasing, and every year making Europe more dependent upon us as producers, and we more dependent upon Europe as our great market, the question in regard to the continuity of this trade becomes one of vital importance both to us and to our purchasers. To show what relation the cotton of other countries bears to ours, and what prospects were apparent at the Exhibition in regard to any successful competition on their part with us, was one purpose in view in the examination made in this department of raw material.

The samples of cotton from the United States were thirteen, embracing specimens from five different States, viz: South Carolina, Georgia, Alabama, Mississippi, and Tennessee. The exhibitors were J. Pope, Memphis, Tennessee; S. Bond, Memphis, Tennessee; Wade Hampton, South Carolina; W. Seabrook, South Carolina; J. B. Merriweather, Montgomery, Alabama; J. Nailor, Vicksburg, Mississippi; G. L. Holmes, Memphis, Tennessee; Daniel Lake, Memphis, Tennessee; R. Jones, Columbus, Georgia; J. V. Jones, Six Oaks, Georgia; Eli Raynor and J. L. Morgan, Alabama; Truesdale, Jacobs, & Co., (a case exhibiting several samples of various grades,) New York; and J. L. Mitchell, Vicksburg, Mississippi. Of these, eleven were full bales, exhibiting the style of bagging and the manner of packing the cotton for market. They were all, without exception, first rate specimens of the various kinds of cotton raised in the States, and showed, not what could be carefully culled and prepared as a museum sample, but just what was the article raised on the plantation.

In distinguishing the actual value of the several bales, it was next to impossible for the most experienced broker to determine exactly the grade which each should occupy, since, while every kind of these cottons was known in market, the quality in the bale was superior to the same quality in the market. The cotton of J. R. Jones, of Columbia,

Georgia—a cotton raised on his plantation in Alabama—was beautifully fine, soft, and silky. It had been prepared with great care, and told well for the process of cultivation he had adopted. The same may be said of Mr. Merriweather's cotton, of Montgomery, Alabama. It was soft, strong, fine, of good color, well handled, and in excellent condition. That of Hon. Wade Hampton, of Charleston, South Carolina, was very similar to Mr. Merriweather's, bearing so strong resemblances in silkiness, softness, fineness of staple, and pure color to that, that it was believed by many brokers who examined it to have been raised in the same neighborhood.

W. Seabrook, esq., of South Carolina, exhibited Sea Island cotton in bale, and a small sample unginned. The character of his cotton is well known in the European market; and his exports are largely in demand. The bale shown at the Exhibition fully sustained the reputation of this unsurpassed production. The seed, I may here remark, was an object of much inquiry. There have been such experiments made upon the island cotton seed within the last year—in extracting its oil and using the residuum for fodder—as to show that, if it can be afforded at a price low enough, the whole seed of the crop, now mainly useless, will come into consumption for these purposes. I directed several letters to South Carolina, calling the attention of growers of the Sea Island crop to this subject.

The specimens from Tennessee were all highly creditable to the exhibitors. The cotton of Mr. D. Lake was of a beautiful color, and carefully prepared; that of Mr. Samuel Bond, soft, strong in staple, and well ginned; that of Mr. J. Pope, fine, silky, and judiciously handled; that of Mr. G. L. Holmes, perfectly ripe, white, soft, and even. Indeed, all these cottons were as good as could be desired, both as regards the quality of the staple or its mode of preparation.

The cotton of J. Nailor, of Vicksburg, was of a very superior quality, combining, with a fine and soft, an unusually long staple, and prepared most perfectly for the market. The cotton of Eli Raynor, though delayed long in arriving at the Exhibition, and thus losing the first examination of the jury, was of a pure white color, silky, and admirably ginned. J. V. Jones, of Six Oaks, Georgia, exhibited a sample of a new kind of upland cotton, called the Jethro cotton, which excited much attention. It has many of the characteristics of the finest Sea Island cotton—soft, silky, long staple, fine, pure, and of a rich color. Should this cotton become generally grown, it will become a favorite article with the manufacturers of the higher class of goods.

When looking at the other samples of cotton in the Exhibition, one impression never left the mind, and that was, that the culture of all cottons other than ours is slovenly conducted. Wherever the specimens came from—India, Egypt, South America, or Spain, even when the cotton looked well—there had evidently been a lack of care, either in planting, gathering, ginning, packing, or finishing, which was of material injury to its character. There was an excellent little series contributed from British Guiana, showing that good cotton might be produced there, but it lacked quantity, from which alone a fair estimate can be made. From Jamaica a good Sea Island cotton was exhibited, which was badly cut in ginning; and from Barbadoes a New Orleans cotton, strong, fine, and silky, but badly colored. The postnatal cottons were specimens of how a good

article can be utterly ruined in preparation. As a whole, the African cottons resemble ours in staple, color, and feeling far more than the Asiatic; but they were, without exception, badly managed and carelessly packed. The Egyptian cottons did not appear to much advantage; two or three bales were shown below the ordinary average; the fibre is good, the staple fine and long, and the color fair; but it is in most cases very badly handled, and far from being clean. The series from Turkey was tolerably extensive, but it included no great variety; the samples were small, and the character was of that short, crispy, and irregular fibre, which rendered it useless for any but the poorest fabrics.

Peru sent one sample of upland cotton, very nearly resembling the Mississippi. It is said to be easily cultivated there, and that, with proper attention, the whole quantity raised may be as good as this. China showed several small bales of a most indifferent quality, though the preparation, like everything from the hands of that pains-taking people, was admirable. Spain sent samples from her irrigated lands, and Algiers some of the same kind—the seed having been obtained from Barcelona; but both were harsh, unfit for the spinner, and good for nothing in the market, unless it might be twisted into candle wicking. Some specimens from Portugal were inferior to those of Spain.

The series of cottons in the East India collection were, in fact, the only cottons in the Exhibition which an American would be likely to examine with any degree of interest. From no other part of the world is it probable that any amount of cotton will ever be supplied to the European market sufficiently to come sensibly into competition with the produce of our southern States; and after the conflicting statements which have been made in reference to the growth of market cotton in the English East India possessions, I was anxious to witness for myself—first, what progress had been made up to the present time, and what prospects were fairly opened for the future. This I was enabled to do at the Exhibition better even than by a personal inspection of the Indian plantations themselves, since it has been the purpose of the East India Company, as I very well knew, to exhibit in a great variety of specimens a fair exponent of the cotton industry of the East.

The East India samples might have been divided into three series—namely, the indigenous cottons, the introduced or foreign cottons, and the improved cottons. The last were evidently a cross between the first two, bearing strong resemblance to each, and forming the best results of innumerable experiments and extraordinary care.

The indigenous cottons are all short staple. They lack the silkiness, lustre, and softness of the Barbadoes or Sea Island variety, and the purity, color, and elasticity of the upland cotton. The series of these indigenous cottons was very large. They presented every variety of appearance—from the style in which they were brought to the Calcutta market, fifty years ago, to the most improved manner of cleaning, ginning, and packing introduced by the company. In all of them, in each particular sample, when examined with care, one impression was made upon the mind, and that was of *carelessness in its preparation*. I do not now recall the number of samples presented, but there was not one among them all which furnished an exception to this impression. There was injury to one sample from over-ripeness; to another from careless picking; to a third from exposure to the weather; to a fourth

from bad packing; and so to the end of the series. In fact everything would seem to be done which is likely to injure the fibre and depreciate its value; and, after observing the wretched condition of these cottons, I could not but turn with wonder to the beautiful products of the looms of Deccan, and ask whether it was possible that the people who were able to manufacture from cotton such beautifully fine fabrics—to which the name of “woven air” seems to be hardly inappropriate—can also be so marvellously careless and slovenly in the preparation of the cotton itself. There are quite a number of varieties of this indigenous cotton, some, of course, greatly surpassing others in natural qualities; but there were none which were presented for exhibition whose merits, under any kind of cultivation or any extent of care, would ever demand for them a good price or a ready sale in the market.

The introduced cottons formed the second series of the East India Exhibition. By these I mean those cottons which have been introduced into India from the United States and other countries, not only with the object of encouraging the production of so important a substance in the British empire, but with the view of rendering them less dependent upon us for so necessary a commodity. It is nearly thirty years since the company first had this subject in view, and it is quite twelve years during which they have given to it a degree of attention, energy, and capital that few articles of natural production have ever received. The samples of this introduced cotton exhibited were, of course, the very best that could be produced. The object was to show to all doubters and inquirers that as good cotton could be grown in India, and furnished to the English market, as that which is imported thence from the United States; and, of course, nothing of pains or expense was spared to produce the desired end. That an entirely different one *was* produced, it was necessary only to consult the opinion of any experienced cotton broker to know. In the first place, and according to the statements of the company itself, the attempt to introduce the long staple or Sea Island cotton into India has resulted in a total failure. It will not grow there in any perfection. Its silky qualities disappear after two or three successive crops, and that which renders it the choice material for the most beautiful fabrics of Brussels and Paris—its susceptibility to being drawn into the minutest thread—is entirely lost. In the second place, the short staple cotton of the New Orleans and upland varieties, though retaining its original constituents in a greater degree, still seems to me to be a very dubious crop for India. Evidently all of these samples had been judiciously cultivated, carefully picked, and attentively packed; and, to a cursory observer, they presented points of full equality to the American. But such they do not sustain either to the sample broker or the manufacturer. The staple is of fair length, but it is coarse, crispy, and seems to lack vitality. It would spin badly in mules used for other cotton, and is, in short, entirely another thing in nature by its change of soil.

The improved cottons of India are entirely the result of careful experiment. They include the best varieties of Java and Borneo cottons, and the Arabian and Chinese. They have been selected with a view to the improvement of native cottons by the most careful management and upon the richest soils. In this case the samples in the Exhibition did not consist of mere experimental products, but of the regular crops from the government farms, sent over during the last four years—por-

tions taken as the best specimens from some hundreds of bales lately received and manufactured in Manchester. This cotton was of a good sound fibre, but very short in staple. It had been well cultivated, carefully picked, thoroughly cleaned, and looked like a marketable article. For many purposes it will answer well, and will meet with a ready sale. It is now the favorite cotton of the East India Company, and their endeavors to supply the market will probably be directed towards this alone for the future. It is not a cotton, however, to take the place of any of ours. It will never enter into competition with them. It is an article so widely different, especially in that most important element—the length of staple—that it must forever occupy by itself a distinct and independent ground.

From what I have said, my convictions must be apparent to the reader, that the cottons raised in the East can never successfully rival those which are the great staple of the South. The reasons for this are undoubtedly to be found in the differences of the soil of the two parts of the world. To the effects produced by climate, although they are doubtless considerable, I do not attach so much weight. But to the total unlikeness of soil, shown not in appearance, but by chemical analysis, the unlikeness of the United States and the East India cottons is to be attributed. The soil in the former—especially the soil in which the finest long staple cotton is grown—is black, sandy, but rich in decaying organic matter; the soil of the latter is also black, but it is a calcareous, clayey soil, the *debris* of volcanic rocks. Though both black in color, the two soils are entirely different in chemical and physical characters. The one is rich in organic decayed matter; the other almost sterile from its want. The climates, indeed, widely differ, and by that difference produce their appropriate effects. But the soils, were the climates the same—the black soil of India and the black soil of the United States, so long supposed to be identical—are too widely different to produce the same results, and by their opposite natures sufficiently account for the deterioration of the transplanted cotton plant.

Ceramics.

Necessity early taught mankind the art of pottery. Long before cloth was woven, or the skins of animals tanned, or wood wrought into articles of utility, or iron hammered, men had been compelled to mould clay into various useful shapes. The art everywhere, in every age and every nation, marks the social progress of the race. As civilization advances among a people, we find a corresponding improvement in its earthenware; and in studying the history of ceramic manufacture, we constantly discover advances and retrogressions in the material employed and the taste displayed, parallel to the condition of the age to which the manufacture belongs. The British Museum has placed in continuous order within its walls the early and later productions of many ancient nations in pottery, and nothing can be more curious than the story of civilization which they record.

Probably at no former time were so many specimens of the ceramic manufacture ever brought together from different nations as were classified in the great Exhibition.

Central Africa furnished specimens of pottery used by the natives in cookery; the Bey of Tunis ranged the rough drinking cups of the country among splendid articles of attire and gilded horse trappings; Burmah and India, beyond the Ganges, sent plates and dishes of the same coarse ware which Strabo described them as manufacturing two thousand years ago; and the Kurch earth potteries of Egypt illustrated by its products both the stationary condition of that wonderful people and the earliest forms into which man had moulded clay to suit his varied purposes.

The establishment of porcelain manufacture in China was of ancient date. Many centuries before the finer materials of ceramic products were at all understood in Europe—before the soils were analyzed or the coarsest compositions made—Canton furnished the boudoirs and drawing rooms of the wealthy, all over the world, with an article the fineness and clearness of which all that science has done for the arts to this day has not enabled the most enlightened nations to surpass.

The great porcelain works of King Tih' Chin sent a complete collection of their materials used, and products made, to the Exhibition—for once, opening and explaining to the world that which they have held a secret for ages. In this connexion it may be well to remark that the two principal materials they have always used in the manufacture of porcelain, the kaolin and the soap-stone, differ in no degree from the China clay of Cornwall (elsewhere described) and the magnesian rocks of the Lizard, the two components of the best ware of Great Britain.

Japan, too, closely resembling China, however, contributed her beautiful red ware, remarkable for the fineness of its structure.

The examples of the ceramic art from the European States were numerous. Among the roughest of these were the wine jars of Spain, manufactured in Toboso, immense in size and uncouth in shape. The royal porcelain manufactory at Copenhagen, celebrated for its reproduction of the classic works of Thorwaldsen, was well represented. By the side of these, and in striking contrast, were the black pots of Jutland. These are an example of primitive manufacture. They are made by the peasants, and are blackened, during the process of burning, by the smoke generated in the kiln, and which appears to form, with the silica and alkali of the clay employed, a very perfect glaze. A beautiful principle is developed in these two products, (of Copenhagen and Jutland,) of the perfection which will result from the influences of a rational mind imbued with the poetic element. That guiding principle of correct taste has produced in the former choice designs and elegant results, while in the latter the useful only has been studied, without the slightest attempt to combine it with the ornamental.

The States of the Zoll-Verein afforded the means of studying the raw material, the rudest ware, and the highest degree of manufacture. There were clays, bottles, drain-pipes, tiles, and terra cotta ornaments; and in addition and striking contrast to these, specimens of that beautiful porcelain which owes its origin to the famous works for which Dresden has been long in high repute. Frankfort on-the-Oder, Luxemburg, and Altwasser, in Silesia, each contributed of its most perfect works.

The royal Saxon manufactory at Meissen exhibited its hardware for chemical purposes. The imperial porcelain works at Vienna presented a series of vases, dinner and dessert services, flower-baskets, and figures. In these last the paintings are of the highest finish, and, as works of art, deserve the first place. Antwerp and Brussels contributed excellent ex-

amples of pottery, especially in the biscuit moulding. Russia sent but two specimens, and these below mediocrity. The national manufactory of France, at Sevres, of porcelain and stained glass, has a world-wide reputation for the beauty of its productions. It should never be forgotten that the results obtained at Sevres are due to a strict attention to the chemical composition of the clays employed, to their physical character, and to an exactitude in the proportions in which the materials are combined. Alexander Brongniart, so well known for his admirable history of the ceramic art, has the direction of the works at Sevres; and Malaguti, with other eminent chemists, is attached to the establishment.

The English manufactories in this branch owe what of perfection they possess to private enterprise. Whilst the great establishments of the continental countries are maintained by the government, and many of them are employed only in producing works of a highly ornamental character—such as the wealthy only can obtain—the art in England has grown to its present condition unaided by patronage, and stimulated only by the hope of gain.

Under these circumstances, the exhibition of English ceramics was highly creditable to British industry and skill; and though in that higher class of artistic merit, which has made the china of Sevres and the porcelain of Berlin world-wide in renown, there was great room for improvement in the more useful class of practical merit, there was much that deserved commendation.

It is deserving of attention in the United States, that the highest success in the ceramic art, in all countries, has been intimately connected with the discovery of the proper material from which its best ware is manufactured. That even so ordinary a production as clay is of great value to a country, might be shown from the results that have followed its study, careful analysis, and use in China, Germany, the Zoll-Verein, and France. It is a very striking fact, that, until Mr. Cookworthy, of Plymouth, discovered the deposit of kaolin, on the southern side of the Tregonning hill, near Helston, in Cornwall, no porcelain was made in England. Cookworthy had obtained possession of some kaolin, sent from China by M. D'Entrecolles, and of some from Limoges, through the celebrated Reaumur, and industriously examined the decomposed granites—granon, as they are provincially called—which occurred in the neighborhood of some property belonging to his family. He ascertained that the clay, which could be artificially separated from this substance, possessed all the chemical and physical properties of the clays of France and of China, and he accordingly patented its application for that purpose, established porcelain works at Plymouth, and eventually sold his patent. This was in the year 1750, since which time the manufacture of porcelain in England has been gradually increasing.

Of the exhibitions of clay there were some twenty-four or twenty-five varieties. In all, the adhesive base was alumina silica, other ingredients existing in very variable proportions. The following analysis of a few of these clays will convey some general idea of their composition:

		Silica.	Alumina.	Lime.	Iron.
Common pottery clay -	-	60	33	3	3
Blue ball clay -	-	64	35	-	1
Cracking clay -	-	68	31	-	1

These clays are usually found united with the coal measures.

	Silica.	Alumina.	Lithia.	Iron.
Cornish China stone - -	68	16	14	2
Do. clay - -	71	27	2	

The ordinary potters' clay is employed for common earthenware, and always burns either yellow or red, according to the quantity of iron it may contain. The blue clay owes its color to the admixture of carbonaceous matter, and is always very white after burning. This clay varies very much in composition, another sample having given, upon analysis—silica, 46; alumina, 38. Cracking clay was first used by the Wedgewoods, and from the peculiarity to which it owes its name it could be used in combination with a large quantity of flint only, as in the Wedgewood stone ware.

The mode of preparation adopted both by the French and English establishments for the China clay is the same. The decomposed granite, which contains much quartz, and usually some mica, is exposed on an inclined plane to a fall of water which washes it down a trench, whence it is conducted to "catch-pits." The quartz and mica are principally retained in the first pit, the water flowing over it into the second, carrying with it only the lighter particles. There is usually a third "catch-pit," which receives the water charged with the fine clay only, the result of the decomposition of the feldspar in the granite. The clay sediment is allowed to settle; the water, as it becomes clear, being drawn off from time to time. By repeating this process many times the receiver becomes full of clay. This is allowed to dry, so as to admit of being cut out into cubical or prismatic masses of sides of about one foot, which are carried to a sheltered position and placed on frames to dry. When considered to be sufficiently void of moisture, the masses are carefully scraped, packed in casks, and sent off to the potteries. The process of preparing and cutting out the clay is usually performed by men and boys; women and girls employed to scrape the dry masses and prepare them for packing.

It appears from parliamentary statistics that about 1,757 tons of this clay were exported from Charlestown, a port near St. Austel, to the potteries in 1809. In 1826 the export had increased to 7,090 tons. Of late years the demand has greatly increased, and China clay is not now used in the manufacture of porcelain alone; but many thousand tons are annually employed in calico bleaching establishments, to give the cloth an artificial whiteness.

There is a particular class of ceramic manufacture which is deserving of notice here, both from its intrinsic value and from the great popularity it has attained—we refer to the parian statuettes, or the statuary porcelain. However doubtful it may be whether the imperfections which must always exist in a material which shrinks one-fourth in the process of manufacture will not have an unfavorable effect upon the production of superior china, no one can doubt that copies of the best productions of art, rendered accessible to the less wealthy classes of society, must tend to the improvement of taste and the advancement of civilization. The first idea of imitating marble in ceramic manufacture is said to have originated in 1842, with Mr. Thomas Battam, the artist directing a large porcelain manufactory in England. The Duke of Sutherland saw the first specimen produced, and became the purchaser of it. Since that time, both in England and on the continent, Parian statuettes have

become a favorite article of manufacture, so that not only have we become familiar through their means with the most celebrated antique statues, but the *chef d'œuvres* of Thorwaldsen, Daneker, Cellini, Foley, Gibson, Westmacott, Bell, Powers, and Greenough, have been everywhere known through these copies.

According to the English classification in the Exhibition, the material of which the biscuit figures and forms are made is divided into three kinds, viz: Statuary porcelain, parian, and Carzara. This is a factitious and perfectly unnecessary refinement, the materials differing only in the proportions of the ingredient used in the manufacture. The composition, according to the analysis, is, silica, 40.35; alumina, 32; soda, 4.16; potash, 2.51; with traces of lime, magnesia, and iron. The material is used in a liquid state, technically called "slip," about the consistence of thick cream. It is poured into moulds forming the figure or group, which, being made of plaster, rapidly absorb a portion of the moisture, and the coating immediately next the moulds soon becomes of sufficient thickness for the cast, when the superfluous "slip" is poured back. The cast remains in the mould for some time at a high temperature, by which means it is, through the evaporation that takes place, reduced to a state of clay sufficiently firm to be on its own weight when relieved of the moulds, which are then opened and the different portions of the subject taken out. Each figure requires many moulds—the head, arms, and hands, legs, body, and parts of drapery, (when introduced,) and the other details of the subject, are moulded separately. The parts, being removed from the moulds, have to be repaired, the seams cleaned off, and the whole put together. This is, of course, a delicate process, requiring much artistic skill; for, though all the parts should even be from the same mould, it by no means follows that all the casts will be of equal merit, so much, in fact, depending upon the taste and skill of the finisher. In the process of drying, as alluded to before, the figure contracts *one-fourth*, so that a model, which, when moist, was two feet high, becomes, when completed, not more than eighteen inches. This necessarily requires many nice adjustments on the part of the figure maker; and, notwithstanding every precaution, a great many of the statuettes exhibit distortions of the limbs and other parts, which arise from the unequal contraction of the clay.

We have said that the first figure was made in 1842, and yet that ought not strictly to be deemed its origin, since, for many years, the works at Chelsea, England, supplied chimney ornaments not altogether unlike these. Many of the old Chelsea porcelain figures were very finely executed, but by far the larger number were grotesque imitations of humanity. Dresden was also celebrated for producing figures, and these were not unfrequently of a fair character as works of art. After this, Wedgewood, of Etruria, England, introduced a stone ware—a vitrified body of a highly silicious character—which has been largely sold in our country. This material was exceedingly valuable for giving permanence to many of the most choice relics which time has spared us of the vases of antiquity. Flaxman aided Wedgewood by his genius, and the result was a high elevation of the character of pottery manufacture. Still the idea of imitating marble in ceramic manufacture did not occur to them, and its real origin is with Mr. Battam, as before mentioned, in the year 1842. Since that time a trade of large commercial importance

to the potteries has arisen, and the introduction of this manufacture has already advanced, and is destined to advance still more, the artistic taste of ceramic wares.

Numerous examples of this manufacture were found in the Exhibition. Messrs. Minton & Co. exhibited statuettes and busts from designs by Daneker, Cellini, Thorwaldsen, Westmacott, Towresned, and Bell. In the Victoria dessert service, which was purchased by the Queen for one thousand guineas, and presented to the Emperor of Austria, was the combination of Parian and fine porcelain, effected with great skill and considerable taste. The service was a full one, consisting of 72 dessert plates, 20 compotiers, and 24 other articles; it is white, turquoise, and gold. In the wine cooler, which stands in the centre, the union of high art with manufacture is finely exemplified. Round the outside it has, in bas-relief, a bear hunt represented, and hunters, with their dogs, form a series of statuette groups round the pedestal. A streak of gold runs in and out through the design, and the whole had a most pleasing effect, the parian contrasting admirably with the glazed porcelain. The whole was crowned with an infant Bacchus pulling grapes. The expense of designing, modelling, and decorating this service, which took twelve months of labor, would have been but little less than the amount for which it has been sold.

Another article worthy of notice was the Parnassus vase, which, like the Victoria service, was a combination of parian and porcelain. The china was in nazarine, richly gilt; while the parian *bas-relief* represented Apollo and the Muses. The modellings of the festoons on this vase are considered equal to Sevres.

There was also a dessert centre, with parian figure supporter. It was in turquoise and gold, with delicately-painted flowers; and the cross S., beautifully brought out before it, marks it as part of a service manufactured for the Marquis of Stafford.

In addition to these, we may enumerate, as objects of especial interest, the Cellini Ewer, by Minton & Co.; Dorothea, Clorinda, Miranda, Una, and the Lion and the Babes in the Wood, by John Bell; the Distressed Mother, after Sir R. Westmacott's Statue, in Westminster Abbey; Love restraining Wrath, an original group, by Beattie; and the Greek Slave, by Powers.

It would be difficult to over-estimate the value of this material, to the manufacture of which it has become so prominent a feature. The successful position taken by the English potters in the Exhibition was due mainly to its introduction, and its prompt adoption by the public.

The increased love of art, which has been created by the multiplication of examples of statues of a high order through this process, is one of the most pleasing of the results which have attended it. Of the salutary influence of the popular cultivation of art, in a moral and social point of view, there can be no doubt; and on this ground, among others, especially in our own country, where works of art must necessarily be for many years to come confined to copies, we desire to see the fine examples in statuary porcelain largely multiplied.

Furniture.

It was not to be expected, in the matter of furniture and decorations, that the United States could contest upon equal ground with the nations

of Europe. Even had we been fairly represented in these productions, had the workshops of our cities sent the products of their handiwork across the ocean, and had the division which we occupied showed a fair exponent of the skill and taste of our cabinet artisans, we must have fallen far below the older countries in the comparison. We have not the wealth (and Heaven grant we may never have!) in the hands of the few, which can find only in the result of years of toil a return adequate to its demands; nor have we such poverty among the many as will render labor, at mere living wages, a god-send thankfully received and readily embraced. Our mission is other than to equal or excel the world in the products of taste. We have lessons to teach in the *capacity* of man, rather than lessons to learn in his handicraft. It is folly to expect that we have reached already, or that we can ever reach, that which is alone attainable where classes in society continue from age to age as the feudal system left them. England might regret, with as much reason, that she could not rear a pyramid to stand for centuries, as we of the United States that it is beyond our power to carve the Kenilworth buffet. Compared with the starving slaves of old Egypt, Europe is as far advanced as we beyond the miserable system that confines the lace-worker to his perpetual dungeon, or ekes out to the Manchester weaver his miserable dole.

And yet there is that in the result of ill-paid toil which, by other means, we may seek to attain. The high standard which the taste of the cultivated minds in monarchical governments has demanded and realized is to be aimed for in a republic where men are born free and equal—not, indeed, to be at once attained, never, in fact, to be reached by the same road, but to be sought as a good to be enjoyed, and even increased, by the only means through which man must hereafter reach all highest excellence.

It is no unimportant indication of the signs of the times, that the mere perfection of a laborious process no longer claims, even in Europe, the highest reward. The rule announced at the Exhibition confined the great medals which should be given to the introduction of a new principle into the useful arts; and though attempted to be passed over by the juries in several instances, the rule was invariably held inviolate in the last decision. Wood carvings of the greatest labor, lace textures of the most wonderful skill, diamond bracelets and jewelled coronets of the rarest beauty, gave place, in the rank of merit, to the reaper and the plough—and this, too, when the one attracted the attention of thousands, and was daily chronicled through the public prints; while the other was passed by unnoticed and almost unknown.

In furniture, upholstery fittings, and general decoration of interiors, England has of late years occupied a place of marked inferiority as compared with her continental neighbors. The furniture of England has ever been in good repute for its sterling qualities, but in forms and ornament, it has been of the worst. The paper hangings of England, for example, have furnished specimens of as bad combined forms and colors as could possibly have been met with in the same amount of space. The reason for this state of things was similar to that in our own country. The decorator, cabinet-maker, and upholsterer were without training in ornament and its application to their purposes. They were without guides. No schools of design existed, no books fitted to instruct them

were known. They were left to pick up the necessary knowledge of form and ornament as they best could.

With these reasons existing, it is not strange that excellence in workmanship and beauty in material should be combined with arrangements of ornament exceedingly unclassical, and questionable in taste.

That a change, greatly for the better, has taken place in England, and that it will not be without good effect in our own country, there can be no doubt. The mere fact alone, that works of merit have been written as guides to artisans, and that they are afforded at a price which will bring them within the reach of all, will produce this result.

Perhaps the most important and highly ornamental piece of furniture, of which a large number was exhibited, was the sideboard, or, as it is termed in England, the "buffet." The largest of the various specimens was found in the French division, exhibited by Tourdrinier. The wood was walnut. The style of ornament, that which is denominated *Renaissance*. Four wood-carved figures in the back, the anatomical detail of which was exceedingly correct, symbolized Europe, Asia, Africa, and America. Dead game and fish, fruit and grain, all of wood carving, were grouped around with admirable skill, and it was only when one remembered that fitness of purpose is the first element of design, that its unusually large dimensions became a drawback on its beauty.

As an offset to this greatly-admired specimen of French taste, Jackson and Graham, in the English department, exhibited a sideboard of oak. Perhaps there was no piece of furniture in the Exhibition that more entirely fulfilled all the conditions of good design, fitness of purpose, purity of style, fine execution, even to the smallest detail, and carefully-selected material, than this. No ornament appeared to be introduced but what had a purpose to fulfil, the best evidence of which was that its removal would leave a disagreeable blank. Careful finish characterized the whole; and there was abundant evidence that from the groupings on the panels, typifying the chase, fishing, agriculture, and vintage, down to the smallest ornament, there had been the hand of an artist in the work. If models of what true taste in furniture is could be brought within the reach of our people, we are convinced that, without additional expense, they would prove the best aids to cultivation. A work like this of which we are speaking would be a source of improvement to the young, as well as an object of admiration to the cultivated; and to the practical cabinet-maker, as a piece of work where sections of mouldings are well preserved, and their intersections carefully attended to—where, in fact, the mechanic has shown himself all that the true workman is proud to be, and has done the most to render a fine design imperishable—the whole thing would be invaluable.

The two articles of which we have spoken were in the *Renaissance* style. Near by the last were a sideboard in walnut, and a cabinet in oak, inviting special attention as models of the *classic* style, marked "Sheffield School of Design." If these were really models of classic furniture, we trust that the *classic* will never extend its influence across the water; for our people would say, as Falstaff said of honor, "We'll none of it." The execution of the work was as admirable as the conception was wretched. The sideboard was, in fact, the model of an indifferent *façade* to a building, and the cabinet suggested the form of

a tomb. Both designs were evidently from the merest tyro in art, as applied to manufactures.

Amid an almost endless variety of articles of furniture in the *Renaissance*, *Louis Quatorze*, *Gothic*, and *Elizabethan* styles, the specimens of classic furniture were exceedingly scarce. The cabinet manufacturers of all countries appeared to shrink from the task of producing a piece of furniture of a purely classic character; probably because the initiated knew the difficulties of attempting to place such designs in the positions suited to them. There was, however, one article—a sideboard, by Poole & Co.—where these difficulties were mainly overcome, and where every line, form, moulding, and ornament would have satisfied the most fastidious. The winged chimeras, combined with chaste Italian trusses, enriched with tastefully carved ornaments, support pedestals in front; whilst finely proportioned and characteristic pilasters give support to the back. The raising of the pedestals from the plinths imparts lightness, and is an acceptable novelty, whilst a graceful “sway” of foliage and fruits links each with the other, and gives a pleasing variety to the outline. The back is a study, as graceful in form as it is novel in character. The oaken wreath—the most honorable of the Roman crowns—is an excellent frame to the bronze satyr, and the two combined form a fine subject and centre ornament for the back. The four columns which carry the lamps are beautifully outlined, and, whilst architecturally correct, are subservient to the happy introduction of a novelty; and the lamps have a place receiving special consideration, and forming an essential portion of the design of a piece of furniture which was chiefly used by artificial light. No portion of detail escaped attention. The upper portion of the lamps is removed at pleasure, leaving the lower—a neat glass vessel—to be dressed, if need be, when the sun is above the horizon, with the originals of the natural products luxuriantly grouped, and finely carved, in the panels of the back. The bronzes on the doors of the two pedestals represent the fable of “Baucis and Philemon.”

The Austrian furniture, by Leistler & Son, received much merited attention through the whole time of the Exhibition. A parlor, dining-room, bed-room, and ante-room had been fitted up in this division, specially to show the style of furniture and decoration in an Austrian house of the first class. The most remarkable feature of these apartments to an American was the parquetric work of the floors, walls, and ceilings. This parquetric, in geometrical forms and a Greek border, was made of solid oak, of an inch in thickness, the squares secured to each other by grooves and tongues cut in the solid wood. It is largely used upon the continent, and, being made by machinery, is furnished at a comparatively low price.

The furniture exhibited in these rooms was remarkable for many reasons. It was of great size. A kind of palatial grandeur was apparent in every article. The wood, of Brazilian growth, very closely resembling zebra wood, was carefully selected. In design, and in carving, it claimed a position that was not reached by any other articles exhibited. Without purity of ornament there were novel conceptions, happy thoughts, brilliant imaginings, and touches of humor that well-nigh confused the beholder. In the oak book-case—a specimen of the florid Gothic—strictly architectural forms were nicely adapted to the purposes of the article, so that the whole effect was original and pleasing. The groined centre

was a capital beauty. Portions of the detail in ornamentation were criticized as being out of style; but they were so unimportant as to be unworthy of notice. This book-case consisted of two, in fact, enclosed in friezes, forming two wings, the centre between the two being canopied with a looking-glass beneath. The space between the two wings might be used as a writing desk. There were wide pilasters at the ends, with reeded columns, capitals, and bases at the angles, playful and happy looking figures around the cornice of the canopied centre, and much florid ornament over the whole.

In the drawing-room were a round table of locust wood, eight feet in diameter; a novel piece of furniture, called a picture stand, for displaying paintings in the centre of the room; and a pair of doors leading to the dining room, of solid oak, twice veneered. The top of the dining-table was also twice veneered—within of lime-wood, without of mahogany. In the ante-room was a centre table elaborately inlaid with boule ornaments, and other articles of furniture equally beautiful. In regard to all this furniture it may be remarked, that only in an old country, where feudal customs still obtain, where labor toils without adequate remuneration, and where wealth is unequally distributed, could it be manufactured or patronized.

Furs.

The exhibition of articles of this class, always a subject of general interest, so far as quantity was concerned, was by no means remarkable. The day has been—perhaps is now—when any large depot of furs in New York could show, in its stock on hand, an amount exceeding in value by ten times all that was arrayed in the Crystal Palace. In variety, however, it was worthy of its place. Through the extraordinary exertions of the parties who had this class in control, the furs of nearly every country on the globe were represented; so that a better field for studying the comparative excellencies of the various kinds, or a more interesting one for inquiry into the habits and character of that order of the animal creation which, more than any other, has ever excited the cupidity of mankind, was, perhaps, never presented. Many articles of this class always have been of very high value. Rich furs were for many ages the friendly offerings of princes to each other, and the tokens of regard to their favorites. In later days, the use of furs, as well as their variety and richness, has greatly extended. The sumptuary laws, which once confined their use to particular persons, were stringent and severe; but these have long been in abeyance, and taste, fashion, and utility have become the sole arbiters in such matters. That such is the fact, let the following curious table, compiled from recently published documents in England, witness:

Imports and Exports of Furs, 1850.

	Importation.	Exportation.	Consumption.
Raccoon - - - -	525,000	525,000	
Beaver - - - -	60,000	12,000	48,000
Chinchilla - - - -	85,000	30,000	55,000
Bear - - - -	9,500	8,000	1,500
Fisher - - - -	11,000	11,000	
Fox, red - - - -	50,000	50,000	
“ cross - - - -	4,000	4,500	
“ silver and black - -	1,000	1,000	
“ white - - - -	1,500	1,000	500
“ gray - - - -	20,000	18,000	2,000
Lynx - - - -	55,000	50,000	5,000
Martin or Sable - - -	120,000	15,000	105,500
Mink - - - -	245,000	75,000	170,000
Musquash - - - -	1,000,000	150,000	850,000
Otter - - - -	17,500	17,500	
Fur Seal - - - -	15,000	12,500	2,500
Wolf - - - -	15,000	18,000	
Martin - - - -	120,000	5,000	165,000
Squirrel - - - -	2,271,000	77,160	2,194,098
Ermine - - - -	187,104	-	104

The value of this table, elucidating curious facts in reference to the taste of the different nations of the world, will appear in the course of our remarks.

The great amount of furs which supply the European market still proceed from our own continent. Russia, indeed, is no small contributor from the boundless wastes of Kamschatka and Siberia; the islands of the Northern and Southern seas furnish tributaries, and both Asia and Africa bring certain quotas, to swell the total trade. But it is from those immense tracts of country over which the Hudson's Bay Company has control, and which are great preserves for Europe, that the varied and exhaustless supply proceeds. The wild and inhospitable character of that Northern region would offer no inducement to human enterprise, had not nature bountifully diffused there a race of rare and curious animals, eminently subservient both to the comfort and elegance of civilized life. It is a striking illustration of the imperfection of geographical knowledge, after all our researches, that so little is known of these territorial possessions of the Hudson's Bay Company, lying but a few degrees of latitude above us, whose object of association is the acquisition of furs. Their possessions cover one-seventh of the habitable globe. It is here, in these immense hunting grounds—mountainous, sterile, and snow-covered for nine or ten months in the year—that the richest furs of the world are found. As warmer latitudes are approached, the rich, fine silkiness of the covering of animals of colder regions disappears; and furs,

still splendid in appearance, indeed, but neither adapted for warmth, comfort, or general use, are met with in its stead.

As it will be impossible to specify within due limits all the different kinds of furs which are exhibited, we will only comment upon the more curious, stating such facts of interest in regard to them as we are able to command.

Her Majesty's furriers, Messrs. J. A. Nicholay & Son, agents of the Hudson's Bay Company, selected from the importation of 1851 such furs as characterized their general trade. This selection was of great value, beauty, and interest. The groups of the varieties of foxes included the black, silver, cross, red, blue, white, and kite. The black and silver fox skins are the most valuable of this tribe—a single skin bringing from \$50 to \$200. They are generally purchased for the Russian and Chinese markets, being highly prized in those countries. The cross and red fox are used by the Chinese, Greeks, and Persians for cloak linings and for trimming their dresses. The white and blue fox are used in England and other countries for ladies' wear. In the English sumptuary laws, passed in the reign of Henry III, the fox is named, with other furs, as being then in use. It has been stated that the fox in the Arctic regions changes color with the changes of the seasons. Such, however, it is now stated by the hunters, is not the case, with the exception of the white fox, which is in winter a pure white and in summer a grayish tint. The otter skins exhibited were exceedingly beautiful. None of these, as will be seen by reference to the table, are used in England; the Russians, Chinese, and Greeks offering a greater price for them for caps, collars, robes, and trimmings.

The day of the beaver has, in a great measure, gone by. In the manufacture of hats it has been entirely superseded, and its present value, when compared with twenty years ago, is almost nothing. It is said, however, to be rising in the market, by a new process of preparing it for ladies' wear having been just discovered, and by the fur being manufactured in France into a costly and beautiful bonnet. In color the skin of the beaver is of a rich brown, similar in appearance to that of the costly sea otter. It is exceedingly light and very durable.

The furs of the lynx and lynx cat have gone entirely out of use in Europe—why, except from the caprice of fashion, it is difficult to say; for their rich, silky, and glossy appearance ought to cause them to be great favorites. I learned from the Messrs. Nicholay, however, that they are now dyed and prepared solely for the United States markets. The lynx fur of the present day is the same as that which used to be called "lucern."

The wolf skins are all exported to Russia, where they are manufactured into sleigh robes. The tail of the wolf is a separate trade, and very valuable; the demand by the Jews for them all over the continent being in advance of the supply.

The North American and European badger, when shown side by side, strongly resemble each other. The quality of the fur of the former greatly surpasses the latter. The European badger's fur is stiff, bristly, and coarse, and is used for shaving brushes alone; while the soft, fine fur of the American renders it valuable and suitable for general wear.

The heraldic associations connected with the sable render it highly interesting to the historian and antiquary. In every age it has been

highly prized in England. The lining of a mantle made of black sables, with white spots, was presented by the Bishops of Lincoln to Henry I at a cost of £100—a great sum at that day. In Henry VIII's time a sumptuary law confined the use of the sable fur to the nobility above the rank of viscount. This fur is still highly valued in England, France, and Germany, and is mostly confined to ladies' wear. The darkest colors are most valuable, and the lighter shades are frequently colored to resemble the darker varieties.

The mink is exclusively a North American animal, and its fur is one of the most admired in Europe. It is durable, reasonably low in price, and, from its rich and glossy appearance, is a more favorite article of ladies' wear than any other in common use. The small, fine, dark mink is this season the rage of fashion in Paris, inducing the exportation of nearly all the last arrivals, and commanding a high price. Almost its rival is the fur of the musquash, or musk rat, now the largest article of import among furs into England. The great use to which it was formerly appropriated—the manufacture of hats—has been entirely superseded by silk plush; but it is now dressed in such a manner as to be cheap, durable and beautiful for female wear, though it is almost invariably sold under another than its real name.

The resemblance between the North American and Russian white hare is perfect. No difference is known to exist between the habits, character, or color of the two animals; both being taken in the same way, and both changing from a pure white in winter to a grayish tint as warm weather approaches. It was formerly much used in its white state for ladies' cloak linings, and other similar purposes, and as a substitute for the white fox; but the skin being exceedingly tender, it has given place to the white Polish rabbit. This fur is also often palmed off, when dyed, for something other than it really is. The same is true of the Hudson's Bay rabbit—perhaps the least valuable of all skins which are imported. The fur is fine, long, and thick; but the skin is so fragile and tender as to render the fur nearly useless.

The black bear skins are valuable. It receives the name of the army bear from the appropriation of its fur into caps, pistol-holsters, and other military accoutrements. The fine black cub-skins are much desired in Russia for shoe-linings, coat-linings, trimmings, and facings. The skin of the white Polar bear, the supply of which is very limited, is generally made into rugs, which are often bordered by those of the black and gray bear. The brown Isabella bear skin is reserved exclusively for sale in the Canadas and the United States. Forty years ago they were the *ton* of the Hudson Bay furs in England, and on the continent; but the caprice of fashion has now reduced the price of a single skin from forty guineas to five, and, in some instances, as low even as one.

The sea otter is the royal fur of China, confined to the reigning family, the mandarins, and great officers of State. It will now command from \$150 to \$200 in the English market for export to the East. It is also in great esteem in Russia; being worn by the wealthy nobles for collars, cuffs, facings, and trimmings. It is very heavy, and thus becomes unsuited for ladies' wear; but its fur is of the thickest, softest, and richest kind, and it is more durable than any other fur in wear.

The fur of the raccoon is greatly admired in Germany; Leipsic is the headquarter of its sale; an annual fair being held there principally to

promote its sale. The skins are appropriate to all sorts of uses in gentlemen's wear, and, when of the darker shades, bring a large price. The cat-lynx, distinct from the lynx, is also a favorite fur at the same fair.

These—with the exception of the swan's-down, of which there were several specimens, most of which is used for ornamental and fancy purposes, and for military plumes—constituted the exhibition of North American furs. The European furs were exhibited by themselves, and deserve a distinct notice.

The Russian sable is, perhaps, the most interesting, and it is the most costly of the furs of Europe. The best skins are worth \$50 at wholesale price in the market. It is usually manufactured into linings, which are generally used as presents by the Emperor of Russia, the Sultan, and other great potentates, at a value sometimes of \$5,000. It is also manufactured into the wearing apparel of the wealthy. Its use in England is mainly confined to the city of London, which city comprises about one-eighteenth of the metropolis called London, where municipal law and custom enjoin its wear by the lord mayor, the alderman, and sheriffs, each having their robes and gowns furred with sable upon all state occasions, according to their rank. It is generally known that the *livery* of London constitutes the free-holders of the corporation. To be free from certain taxes, to buy and sell certain goods as trades-people, to vote for city officers, and to possess certain other privileges, one must belong to the livery—that is, he must be a member of one of some eighty companies, such as the Goldsmiths, Drapers, Pewterers, Ironmongers, Tailors, &c., which have been in existence from five hundred years and more back, paying his annual fees in order to enjoy the freedom of the city. These companies are generally very rich, and have what is called a court, composed of masters, wardens, deputy wardens, &c., whose chief duties appear to be the appropriation of the income of the company they represent towards weekly and monthly public dinners for themselves and wives. These members of the court are obliged to wear a certain dress, lined and faced with Russian sable fur, upon all public occasions; and as these occasions, where the funds of the company are well vested, require observance some fifty times in the year, the market for the sable fur is not likely to be soon dull—certainly not so long as Parliament allows London to retain its privileges as a close corporation. The tail of the sable is universally used in the manufacture of artists' pencils and brushes; it being preferable to all other fur. It is also used for muffs and boas. Russia produces about 25,000 of these beautiful and admired skins annually. Naturalists have not yet decided whether this species is identical with that from North America; the fur of the former being much finer, softer, and longer than that of the latter.

The stone-martin, of which several groups were exhibited, is widely spread over Europe, and derives its name from the fact of the animal selecting rocks, ruined castles, &c., as its haunts. The fur, in its natural state, is soft and fine, and shades from a light to a dark bluish-gray, taking the color of the rocks among which it is found. The throat is invariably a pure white. The French excel in dyeing this fur, and it is thence termed the French sable. It is extensively used in England,

and being a permanent color, much like the true sable, it is a great favorite.

The groups of ermine—a fur little known in reality in our country—were very attractive. For more than a thousand years the fur of the ermine has been associated with the dignity of the throne and the bench. In England, at the coronation of the sovereign, the “minever,” as the ermine is styled in heraldic language, is used, being “powdered”—that is, studded with black spots; the spots, or “powdered bars,” on the “minever” capes of the peers and peeresses being in rows, and the number of rows, or bars, denoting the degrees of rank. The sovereign and the members of the royal family have the “minever” of the coronation robes powdered all over, a black spot being inserted in about every square inch of the fur. The crown is also adorned with a band of “minever” with a single row of spots. The coronets of the peers and peeresses have also a similar decoration. The black spots are made of the skin of the black Astracan lamb. On state occasions, in the House of Lords, the peers are arrayed in their robes of state, of scarlet cloth and gold lace, with bars, or rows, of pure “minever,” more or less, according to their degree of rank—the sovereign alone wearing the pure “minever” “powdered” all over. The judges, in their robes of office, are clad in scarlet and pure ermine. The ermine, with the tail of the animal inserted therein, is used as articles of dress for ladies, in every variety of form and shape, according to the dictates of fashion. The “minever” can only be worn on state occasions by those who, by their rank, are entitled to its use. In the reign of Edward III, furs of ermine were strictly forbidden to be worn by any but the royal family; and its general use is prohibited in Austria at the present time. The ermine is obtained in most countries; but those of the purest white are found in Russia. It is the same animal with the weasel of more southern climes. The animal is killed in the winter, when the fur is pure white, (except the tail, with its jet-black tip,) it being, in that season, in the greatest perfection. In spring and summer it is gray, and of little value. In mercantile transactions the ermine is always sold by the “timber,” which consists of forty skins. The “minever” fur of olden time was always taken from the belly of the gray squirrel.

The squirrel has, in fact, always furnished an article of fur that has been highly prized in England. At the time just alluded to, during the reign of the third Henry, its fur was included in the sumptuary laws of that period. Even now the amount of squirrel fur used in the kingdom exceeds nearly three-fold that from all other animals. The greatest importation of this fur is from Russia, though vast quantities come from North America. The importation for 1850 exceeded two millions of skins from Russia alone. The fur of the Russia gray-squirrel is esteemed more highly for its glossy surface than any other. It is manufactured entirely for ladies’ and children’s wear. For cloak and mantle linings it is particularly suitable, its moderate cost adapting it to general use. The celebrated Weisenfels linings are manufactured from the belly of the dark-blue squirrel. The exquisite workmanship and lightness of these linings are without parallel—a full-sized cloak lining weighing only twenty-five ounces. This favorite commodity is known as the *petit gris*. For colder climates the linings are made from the back, or plain gray part of the squirrel, (the belly part being white,) the best qualities having the

tail left upon the skin. The lighter colors of squirrel-skins have lately been dyed to resemble sable, and are successfully palmed off upon the public as that article.

Some forty years ago, the fitch, or polecat, furnished one of the most popular kinds of furs. Its color was rich—the top hairs a jet-black, the ground a rich yellow—and its durability surpassed all other furs. As it could be never entirely rid of its odor, it was gradually banished from use in personal wear, and is now a drug, comparatively, in the market.

Various specimens of lamb skins were shown at different stalls in the Exhibition. Among these, the best were from the Crimea and Astracan, though beautiful color and exquisite softness characterized many that were brought from Persia, Hungary, and Spain. The Russian department also exhibited some lamb skins, dressed in a peculiar style, for gentlemen's coat linings, and for many purposes. The Astracan lamb possesses a rich, wavy, glossy, black skin, extremely short in the fur, and having the appearance of watered silk. Upon inquiry as to how this appearance was produced, it was ascertained that, in order to obtain the perfection of lamb skins, the mother sheep is killed before the birth of her offspring. Hardly less beautiful than the Astracan is the Persian gray and black lamb fur, covered as it is by the minutest curls possible. This, too, is produced not by natural means, but by a method of sewing the lamb up tightly in a skin as soon as it is born, and not removing it until the desired curl is produced. Both these furs are costly, but they are very much desired for military cloaks upon the continent. The national coat, called *Juhasz Bunda*, of Hungary, is made from lamb skin; and the short jacket of Spain, adorned with silver filigree buttons, is from the same material. In the reign of Richard II the sergeant-at-law wore a robe furred inside with white lamb skin, and a cape of the same.

The cat skin, whether of the wild cat of our northern forests or of the "tabby" of the fireside, is again coming into favor. The Hungarian wild cat, from its greater size, longer fur, gray color, spotted with black, and its peculiar strength, is most esteemed; but all furs of the cat are now in requisition; and so great was the demand during the fall months of the present year for the article that hundreds of thousands of domestic cats in England were stolen and bagged for the market.

The show of seal skins was perhaps the best in the way of furs. With the history of this animal, so far as its skin furnishes commercial employment, we are far more familiar than our English cousins.

The seal is found in the cold climates of the North and South, and is procured by our whalers both for the value of its oil and the demand for its skin. The skins, when taken from the animal, are salted and packed in casks. When opened, they are assorted: those suitable for leather pass into the tanner's hands, making a beautiful material for ladies' shoes; those suitable for the furrier—the blue-black, the hair, and the silver seal—are dressed and sold. The manufacture of the seal fur is brought to a high state of perfection. When the skin is divested of the long coarse hair, which protects the animal in its native element, there remains the rich, curly, silky, yellowish down, in which state it was long used for travelling caps in our northern and eastern States. These having now been proscribed by fashion, the fur is dyed a beautiful van-

dyke brown, giving it the appearance of rich velvet; and it is made into every variety of shape and form for the wardrobe.

The chinchilla is exclusively obtained from South America. It is about 40 years since it was first introduced into the European market. Of all other furs it has held its ground, having had nearly the same demand, and selling for the same price, since it was first used. Its extreme softness and delicacy confine it to ladies' wear.

Leaving the torrid zone, we will say a word upon the skins which were exhibited from the tropics. There were fine specimens of the skins of a lion, tiger, leopard, and panther exhibited in the Indian department—that is, in the department devoted to products from the East India Company's possessions. There is little of interest connected with tropical furs or skins, excepting as connected with the uses they subserve in various countries. In China, the mandarins cover the seat of justice with the skin of the tiger. In Austria, the small fine leopard skin is worn as a mantle by the Hungarian noblemen of the Imperial Hussar Body Guard. In England, the use of the leopard's skin as housing for the saddle is forbidden to officers below a certain rank.

The Angora goat of Asia Minor is remarkable as producing a long, curly, rich, white, silky coat. It was formerly a most costly and fashionable article of female wear, but has now gone into disuse. When dyed, it takes some of the most beautiful and brilliant colors. It is also woven into rugs for drawing-rooms, halls, carriages, &c.

There is an aquatic bird found in the large lakes of northern Europe called the Grebe, (*Podiceps cristata*.) It is also killed in the forests of Germany. The feathers taken from it are of the purest white, having the appearance of polished silver, the plumage on the outer edge of the skin being a rich dark brown. It is one of the most durable of feathers, the smoothness of the surface preventing its soiling in wear, and is at the present time in great favor for the dresses at court.

Of the universally used downs—the swan, goose, and eider—nothing new can be said. In the neighborhood of the specimens of these was exhibited the duck-bill platibus, a native of Australia—a bird whose existence was long denied by naturalists. It is certainly one of the most extraordinary animals in nature, supplying a sort of connecting link between the bird and the beast, having the claw and body of the latter, with the bill and web-foot of the duck. The male is furnished with two powerful spurs on each hind-leg, similar to the game cock. The female lays eggs, which she hatches, and then suckles her young brood. The skin strongly resembles that of the otter, but seldom exceeds twelve inches in length. Many attempts have been made to take them alive, but without success.

Passing from the raw skins and furs to the articles manufactured from them, but little need be said. There is probably no article of commerce in which so much deception is practised as in furs—and this not upon the wearers only, but also upon all buyers after the skins have left first hands. Among the great exhibitors, after the Messrs. Nicholay, were Messrs. Robert Clarke & Son, Mr. Ellis, the Messrs. Pawson, Mr. Sampson, and Messrs. Luge & Co., all furriers of London. The manufactures of the Messrs. Nicholay, however, far surpassed the others, and it is said that so great is their skill and influence, that the prevailing style of furs for the London season depends upon their decision. The seal

fur has been upon the decline in trade for several years, while imports to the market have increased. Among their display were to be seen dresses of seal fur, colored a vandyke brown, for her Majesty the Queen, and for the princesses, whereupon, for the present winter, the demand for seal dresses has so far outrun the supply that the price of the article has greatly increased.

M. Rea, of Paris, exhibited a muff and boa made of the down which forms the military and state plume known as the aigrette, procured from a bird called the eigret, which ought not to pass unnoticed. This material is far more costly than even the most choice of the eider down. Its rarity is so great, that three other sets only have been made during the present century, viz: one for the Empress of Russia, one for the Duchess of Berri on her marriage, and one for the Princess Adelaide, sister of Louis Philippe. The articles are beautiful beyond all description, as the reader will judge they ought to be at a price of 500 guineas.

Carpets.

The use of carpets is far more universal in the United States than in any part of Europe. The floors of concrete, which are almost universal in houses of the middle and humble class upon the continent, are nearly unknown in our country; while the polished deal and oak, universal in the baronial halls and palaces, with or without the addition of parquetrie, have never to any extent been introduced across the water. Of course upon the subject of carpets little can be written that would be useful or interesting in a Report like this, and the subject is referred to more for the reason that several very important improvements have of late been introduced into carpet-manufacturing abroad, the knowledge of which may be serviceable to our own carpet-makers, than for anything else. With a few words of preface in reference to the past history and present condition of this branch of industry, we will immediately proceed to describe what those improvements are.

Carpets are entirely a modern luxury. It was not until the seventeenth century was somewhat advanced that carpets were considered a necessary article of furniture by the wealthy; and up to so late as the beginning of the nineteenth century, whether in the United States or Europe, the use of carpets was exclusively confined to the independent in means of living, if not to the wealthy. The first carpets used in England were brought from Persia. In after years, for the space of nearly half a century, the greatest importation of them was from Flanders. The former country still furnishes its small quota of supply for the European demand; but France has for many years past supplanted Flanders in supplying the richer classes with the best specimens of design and coloring. Persian carpets are now what they always were in manufacture and design. Like the manufacturers of China, India, Turkey, and Tunis, they show no improvement; and it is evident that the day is not far distant when their manufacture will become as extinct as the manufacture of cottons, for which India was once so famous.

Contrary to universal belief, there are but few *kinds* of carpets. The mode of operation pursued in producing tapestry and Tournay, Axminster and Wilton—names given at the caprice of the maker, and in most instances neither indicating the locality of the manufacture nor the quality

of the carpet—is precisely similar. In fact, Axminster no longer produces carpets, the business there being utterly extinct. Tapestry carpets are those produced by the needle; they are, in fact, needle-work carpets, in which machinery has very limited duties to perform, and those of a simple character. Tournay and Axminster carpets are produced by hand also; a machine, if such it may be called, which is nothing more than a frame, such as ladies use for stretching their canvas for needle work, is set up perpendicularly, and the woman occupied in the production is seated in front, and works horizontally. Each thread is knotted to the foundation or back, and is not in any other way connected with any other thread. Velvet pile, royal pile, and Saxony carpets are all the same kind; the names being given at the caprice of the manufacturer, and conveying no definite idea of the quality. They are each and all manufactured in the same loom; are all, in different degrees, the same fabric, and often the same pattern, as Brussels carpet. In fact, the *worsted loops* is the distinguishing characteristic of the Brussels carpet. When cut open by a razor, the tool used by the weaver for the purpose, passing across the carpet, and guided in its course by a grooved wire, over which the loops have been formed, it becomes a “Saxony;” a wire of larger dimensions produces a larger loop, and this, laid open by the same primitive process, produces a “velvet pile.”

Here, again, we may notice that names are capricious. Brussels supplies but few of the carpets that bear the name, and Kidderminster manufactures altogether a different article from those which it gives appellation to in the market.

No single article in the way of carpeting—in fact, perhaps no single article of any kind—attracted more attention throughout the time of the Exhibition than the tapestry carpet from the Gobelins. The date of this world-renowned national establishment of France is very remote. From the 14th century dyers in wool have been established in the Faubourg St. Marcel. One of them, Jean Gobelin, who lived in 1450, acquired considerable property in the neighborhood. His descendants continued his trade with success, and, having become extremely rich, gave great renown to their manufactures. Louis XIV purchased the premises and erected there a national manufactory. From that day, what of genius, taste, science, and wealth could be devoted by the patronage of the French government to the production of Gobelin’s tapestries, has been done. In the tapestry work, the workman stands at the back of the canvas on which he is employed, with the model behind him, to which he occasionally refers, in order to adjust the color of his woollen or silken thread to that part of the picture he is copying. The object of the process being to present as smooth and delicate a surface as possible, all cuttings and fastenings are performed at the back. Hence the necessity of his working on the wrong side. Some of these carpets take as long as ten years to finish, and cost 150,000 francs. They are never sold. The closeness with which the painter’s art is imitated is wonderful. In the battle scene represented in the large piece sent to the Exhibition, it was impossible to detect a shade of difference from the real picture—the drawings, the colors, the perspective, all being precisely similar to the model.

In the patented processes by which English carpets are just now being made, there is much that looks like an entire revolution in the old

way of manufacture. To understand the results, the means by which they are arrived at being kept secret, it is necessary to go back to the first improvement in the manufacture of Brussels carpets, patented by Mr. Whytock. In the old method of this manufacture, about two-fifths of the worsted is used in the *back* of the carpet, and seven colors are the greatest number which can be introduced by the weaver; in consequence, the carpet is more costly than is necessary for wear, good material being consumed in a part never used; and the designer finds himself shackled by the limits to his coloring. By Mr. Whytock's invention, each individual thread is dyed with all the requisite colors of the carpet, and in the precise quantities required for its position in the pattern. The objection to this improvement was, that while it gave no limits to the colors required, it demanded a nicety of calculation that subjected the whole product to the risk of ruin upon a single mistake in the weaver: neither did it affect the price of the kind of carpets to which it was applied, since all that was gained in the saving of worsted from the back was lost in the enhanced difficulty of the manufacture.

Another patent was obtained, and is worked by Messrs. Templeton & Co., of Glasgow. It is used only for producing carpets of a superior quality, which are expected to find consumers among those who would otherwise be purchasers of tapestry or Axminster. It is sufficient for our present purpose to say that by this patent *chenille* is dyed and woven in pattern as *worsted* is dyed and woven by Whytock's patent. In the method of working, some differences exist between the two, but the general result is the same.

But the patent which we have now reached, and to which we beg to call the attention of our carpet manufacturers, is that of Messrs. Bright & Co. By this process the carpet is woven, without colors, simply in white worsted, by the ordinary power looms. The wires used in the ordinary process are entirely dispensed with, and the loop is formed by an arrangement in the machinery. The pattern is then printed on the carpet by a process that strikes the colors quite through the fabric, and, at the same time, prevents the possibility of their running into and mixing with each other; thus a Brussels carpet is produced by a simple mode of operation, and by machinery that is admirably and ingeniously adapted for the purpose. By this process an immense saving in cost must be effected, while the designer is left free to indulge his taste or fancy to the utmost. Instead of the razor, heretofore used to cut the threads in producing the "velvet pile" carpets, the whole process is accomplished by mechanism. While the process of weaving is going on in the loom, an instrument is put in motion that cuts the loop with perfect accuracy. The process is far from what it may become, but it suggests an idea in the manufacture of carpetings which will certainly be shortly realized.

Towards the close of the Exhibition, Mr. Bigelow, of Boston, exhibited several specimens of Brussels carpetings woven by the power-loom, which excited much attention. This process, invented and patented by Mr. Bigelow, and now in general use in the United States, is altogether unknown here, the owner of the English patent objecting to its use here, as likely to be detrimental to the business at home. It is, perhaps, one of the greatest improvements yet made in weaving, and accomplishes what has heretofore been deemed an impossibility, viz: the use of all varieties of colors in the power-loom.

PART III.—MACHINERY.

There was no department in the Exhibition which presented to the spectator so much to attract his observation and occupy his thoughts as that of machinery.

The great influence which machinery is destined to exercise over the fortunes of mankind can scarcely yet be understood even by the most enlightened; for there is no limit to its power, no boundary to its application. Here it is that we discover how mechanism is extending her dominion over the whole empire of labor; how she rises in textile fabrics to the manufacture of the most delicate and intricate lace; how, from wood, she aspires to fashion iron into the most exact proportions; how, with steam as her handmaid, she works the printing press and navigates the ocean, and outruns the swiftest animal in her course. Turn into the agricultural implement department, and we find everything now done by machinery. By it the farmer not only sows and reaps, but he manures and hoes; by it he threshes out and grinds his corn and prepares the food for his cattle. He can even drain by machinery, and it is difficult now to find a branch of his business into which it does not largely enter.

The space allotted to machinery was divided into six classes, commencing with—

CLASS 1.—*Machines for direct use, including Carriages, Railway, and Marine Mechanism.*

In this class the number and interest of the objects displayed were very great; more particularly as regards the steam engines, of which the show was on a scale commensurate with their importance, many exhibiting admirable specimens of workmanship and new adaptations of mechanism to increase the power of the engines and to add to their safety.

The “Liverpool,” locomotive engine; built by Messrs. Curtis, Burry, & Kennedy for the London and Northwestern Railway.

This gigantic machine is constructed on the principle of the Crampton patent, the peculiarity of which is that the driving wheels are placed at the rear of the engine, immediately under the fire box.

It was built when the “battle of the gauge was raging at its fiercest,” and when it was one of the favorite boasts of the broad gauge champions that an engine equal in force with the largest in use on their gauge could not be made to run on a 4-foot 8½-inch gauge. To prove the contrary of this was the object of the “Liverpool.”

This great machine is supported on eight wheels, the driving wheels being eight feet, and the supported wheels four feet, in diameter. The cylinders are eighteen inches diameter, and twenty-four inches stroke.

The evaporating power of the boiler must be enormous, since the heating surface exposed to the direct action of the fire is 156 square feet, and the total surface of the tubes which traverse longitudinally the boiler, and by which the gaseous products of combustion are conducted from the fire-box to the chimney, and strained of their heat *en route*, is not less than 2,090 square feet.

It contains, therefore, 2,090 feet of heating surface, being 270 feet more than the largest engine on the broad gauge. The weight of the engine, when supplied with its full complement of coke and water, is 37 tons. Its length is 32 feet. It is stated to have attained a speed of 100 miles an hour with a train of 39 loaded carriages.

The "Lord of the Isle."—Sent by the Great Western Railway Company.

This is one of the ordinary class of engines constructed by the above company since 1847. It is one of the largest yet built by them for their broad gauge line. It is capable of taking a passenger train of 120 tons at an average speed of sixty miles an hour upon easy gradients. The evaporation of the boiler, when in full work, is equal to 1,000-horse power, of 33,000 pounds per horse; the effective power, as measured by a dynamometer, is equal to 743-horse power. The weight of the engine in working order is 35 tons, which does not include the tender, which, under similar circumstances, weighs 17 tons 13 cwt. The diameter of cylinder is 18 inches; length of stroke, 24 inches; diameter of driving wheel, 8 feet; and the maximum pressure of steam, 120 pounds on the square inch. The actual consumption of fuel in practice, with an average load of 90 tons, and an average speed of 29 miles, including stoppages, (ordinary mail train,) has averaged 20.8 pounds of coke per mile. The tender is capable of containing 1,000 gallons of water and $1\frac{1}{2}$ ton of coke.

Ariel's Girdle.—A locomotive, invented by Mr. Adams, of Adam St., Adelphi, London.

This engine is on four wheels, and contains its supply of water and coke without requiring a tender. It is called a tank engine, and exhibits several improvements, the chief of which consists in its mode of connexion with the passenger carriages. Long iron arms project beyond the buffers, and are inserted into the frame work of the adjoining carriages in such a manner as to give mutual support should the axles of either the engine or of the carriage break.

This engine may be readily detached from the carriages by means of a handle at the back, within reach of the engineer. The weight of this combined engine and tender, capable of containing a supply of water and coke to serve for 50 miles, is only eight tons. It is calculated to propel three loaded carriages at the ordinary speed.

A light Locomotive.—By Messrs. Wilson & Co., Westminster.

The peculiarity of this engine consists in its having two boilers heated by the same furnace, by which arrangement a larger heating surface is obtained, with the important advantage of lowering the centre of gravity, thereby increasing the steadiness of motion and diminishing the risk of running off the rails. This is also a tank engine, and will carry 520 gallons of water, its weight 16 tons, and 40-horse power.

Hydraulic Press.—The Bank Quay Foundry Company, Warrington.

This hydraulic machine is the one by which the memorable engineering power of raising the tubes of the Britannia bridge from the level of

the water to their permanent position—a height of 120 feet—was executed, and cannot fail to attract the attention of all who are capable of appreciating the wondrous expedients supplied by science to art.

Let us, imagine two strong cylinders of cast iron, one of a large the other of small capacity, having a pipe of communication between them, in which a valve is placed opening from the small towards the larger cylinder.

At the top of each of these cylinders is a water-tight collar, in which is inserted a cylindrical rod, turned exactly to fit the collar, and which, moving in the collar so as to be water-tight, descends into the cylinder. These rods are each a little less in diameter and in length than the cylinders, so that, when they have descended in them, a space will remain around and below them. The larger of these rods, which moves in the great cylinder, is called the "ram," and the smaller, which moves in the lesser cylinder, is called the "plunger."

We will then suppose that the ram is let down in the great cylinder, and the plunger raised to the top of the small cylinder, and let the two cylinders and the communicating pipe be imagined to be completely filled with water.

If the plunger be then pressed down in the small cylinder, it will drive so much water as it displaces from that cylinder through the communicating pipe and valve into the large cylinder, where the ram will be compelled to rise to give space for it. The height through which the ram will be thus raised will depend on the proportion which its magnitude bears to that of the plunger; thus if the bulk of an inch of the ram be 500 times greater than the bulk of an inch of the plunger, it is evident that the 500th part of an inch of the ram will occupy a space equal to and will displace as much water as would an inch of the plunger. To raise the ram, therefore, in such case through the height of one foot, the plunger should be moved through 500 feet.

Each time that the plunger is raised to repeat the stroke, water is drawn in the lesser cylinder, so as to refill it from a reservoir, on the principle of the common pump; and during this process the water which had been driven into the large cylinder cannot return, being stopped by the valve of the communicating pipe, which only opens towards the larger cylinder.

To estimate the force with which the ram will be pressed upwards by the water driven under it, we must consider that the pressure produced on each square inch of the section of the plunger will produce an equal pressure on each square inch of the ram. This is an immediate consequence of the fluidity of the water which is interposed between the plunger and the ram. If, then, as we have supposed, the section of the ram be 500 times greater than the section of the plunger, it will follow that a pressure of one ton exerted by the plunger will produce an upward pressure of 500 tons upon the ram.

Such is the general principle and such the essential parts of the hydraulic press, of which so stupendous a specimen is presented to the visitor in the machine which raised the Britannia tubular bridge from the surface of the water and placed it on the piers at a height of 120 feet.

The weight and bulk of this cyclopean engine are in accordance with its vast mechanical power. The great cylinder is 9 feet long, 22 inches in-

ternal diameter, 10 inches thick, and weighs 15 tons. It is a perfect mass of cast iron. Allowing for waste, 22 tons of fluid incandescent iron were required for this enormous casting. After being left for 72 hours in the mould in which it was cast, the mould was detached from it. It was still red hot. It was then left to cool, and it was ten days before it was sufficiently cool to be approached by operatives, well inured to heat, for the purpose of detaching from it the part of the sand of the mould which still adhered to it.

The ram, which is the immediate object that receives and transmits the pressure, is also cast iron, measuring 20 inches diameter, and weighing 3 tons 13 cwt.

When the weight and bulk of these working parts of the engine, and the vast force exerted by them, are considered, it will be easily understood that corresponding strength must be provided in the framing and moulding it. The cylinder is enclosed in a cast-iron jacket, bound round by wrought-iron slabs, which being placed around it when red hot, were allowed to cool, and in cooling contracted so as to grasp the casting with irresistible force. The weight of this compound jacket of cast and wrought iron is eight tons.

The cylinder and ram thus enclosed in the jacket rest upon horizontal beams of cast iron, each of which weighs five tons. These beams themselves rest upon compound girders of curious construction, which form the basis and bear the entire incumbent weight of this immense piece of machinery. These girders are composed of plates of wrought iron $\frac{5}{16}$ of an inch thick, alternated with boards of American elm $2\frac{1}{8}$ inches thick, the timber and the iron being united after the fashion of a sandwich, and the entire girder being composed of six plates of iron alternated with six interposed boards of elm. This compound beam of wood and iron—the plates and boards being placed with their planes vertical, their edges being presented upwards and downwards—is secured at top and bottom by twelve wrought-iron bars extending the whole length of the beam. The weight of each of these sandwiches is twelve tons.

The means by which the ram is made to elevate the bridge is as follows: to the top of the ram is attached a cross-head of cast iron; the ram, being, as we have stated, a cylindrical rod twenty inches in diameter, is let into a hole of corresponding size made in this cross-head, on which it is securely fastened. The weight of this cross-head is thirteen tons.

To prevent the ram from suffering any lateral strain during its action, the cross-head is made to work on vertical guide rods of wrought-iron, each six inches in diameter, which are fixed in sockets on top of the press. To the cross-head were attached the chains which descend to the level of the water and embrace the tube to be raised.

The greatest weight lifted by the press was 1,144 tons, but it was capable of raising 2,000 tons. The quantity of water injected into the great cylinder in order to raise the ram six feet was $81\frac{1}{2}$ gallons. When a lift of six feet was effected, the lifting chains were seized by a set of clamps under the lowest point to which the cross-head descended, and, while they were thus held suspended, the water was discharged from the great cylinder. Meanwhile the lengths of the chains above the clamps were removed, and the chains thus shortened attached to the cross-heads by other clamps connected with the cross-head, and all was prepared for

another lift. In the practical operation of the machine each lift occupied from thirty-five to forty minutes.

Planks of cold iron, of different thicknesses, have been punched by this machine, and it has been found that for the thickness of one-and-a-half inch a pressure is required of 700 tons, and for three and-a-half inches' thickness, a pressure of 2,050 tons. This being a single press is the largest one yet made.

Model of Patent Locomotive Machinery for working up or down steep inclines from or to Wharfs, &c.—G. D. B. Beaumont, London.

This model only shows the principle of bite for steep inclines; the same principle, with different construction of leverage, is adapted to common roads, and has lately been worked successfully by locomotive steam engines.

Railway Carriage.—Exhibited by the London and Northwestern Railroad Company.

One of the great disadvantages under which the management of the passenger traffic on the railways of the United Kingdom has labored hitherto, is the disproportionate ratio of the dead weight to the profitable weight in the passenger carriages, as commonly constructed. Thus first-class passenger carriages, which will weigh, empty, from four to five tons, will generally be incapable of transporting, when full, more than eighteen passengers, without luggage; while, in our own country, it is well known that railway carriages are worked which transport eighty passengers, with very little more dead weight. An attempt is made to obviate this great waste of power in the form of this new style of carriage. This vehicle, which was constructed at the company's works at Wolverton, besides economizing the dead weight, is also so constructed as to have greater durability and safety in consequence of introducing the use of iron, instead of wood, into the framing and body of the carriage. The sheet-iron which is used for the panelling is corrugated, which, while it increases the strength, gives greater external beauty to the outline and appearance of the vehicle. The carriage is supported by six wheels of peculiar construction, each wheel being formed of wrought iron in one solid piece, tire included—an arrangement which obviously gives greater security against fracture than the common mode of constructing the wheels in parts. The length of the carriage is forty feet, by eight feet in width, and is divided into two first-class bodies, each capable of accommodating eight passengers, and so lofty that a person of ordinary stature can stand erect with his hat on. There are five compartments, each of which accommodates 12 second-class passengers, besides compartments of sufficient magnitude for the luggage of the passengers and accommodation of the guard. Thus this carriage may be regarded as a train in itself, capable of conveying 76 passengers, with their luggage and guard; the total weight of the carriage, without its load, being eight and a half tons. To convey the same number of passengers with the carriage at present in use would require a dead weight of 17 or 18 tons. There are other features worthy of observation in this vehicle. One of these is the contrivance for facilitating the motion of the carriage through curves.

The Locomotive "England."—Built by G. England, New-cross, London.

The great feature in this engine is its great lightness in proportion to its power, and the combination of the engine and tender upon the same wheel; and the purpose in view is to work trains of light weight. Its constructors affirm that it has sufficient power to impel a train of six first-class carriages at a speed of 60 miles an hour, and, if their expectations be realized, it will accomplish this at half the working expenses of the engines now used for such trains. Although it has no tender, it is stated to be capable of carrying a stock of fuel and water sufficient for a stage of 50 miles, so that it would be capable of taking a train from London to York by a feed of fuel and water at three intermediate stations.

Small working model of a Locomotive Engine for common roads.—Made by W. Murdock, Birmingham, as far back as the year 1785.

A spirit lamp constitutes the furnace of this machine. The cylinder is attached directly to the boiler, and the piston rod works a horizontal beam, that communicates motion, by means of a crank, to the driving wheels. It is worthy of notice that the once favorite project of travelling on common roads, propelled by steam, has no other representative than this diminutive and original specimen.

Marine Engines, of collective power of 700 horses, designed for driving the screw propeller by direct action.—Messrs. J. Watt & Co., London, and Soho, Birmingham.

These engines are arranged to act almost directly on the crank that turns the shaft of the propeller, and the cumbrous beam and connecting rods are dispensed with. The direct action engines seem now to be generally superseding the beam; and in the engines exhibited the great point of competition seems to be the best means by which the action can be directly communicated from the piston rod to the crank. In these large engines of Messrs. Watt & Co. the piston rods work in guiding grooves on the plan which we believe was originally introduced by Messrs. Mandsly & Field, and a short connecting arm communicates the motion to the crank. The cylinders are of large diameter, and short, to adapt them to the direct communication of motion which is facilitated by a small crank. These engines, in construction and workmanship, present an excellent specimen of the perfection Great Britain has obtained in the manufacture of marine engines of great power. The advantage of direct action seems to have been understood in the earliest construction of steam engines, and the plan of applying it was then similar to the arrangement we have been wont to consider new.

Sectional models of Steam Engines.—Watkins & Hill, Charing Cross.

By means of these admirable instruments of instruction all the internal parts of the engine may be seen, each part being animated with its proper motion. The engine is supposed to be cut through by a longitudinal vertical plane; one side of the model exhibits the real form of the engine, and the other side exhibits the section showing its internal

mechanism. All the pistons, valves, slides, levers, and other moving parts, move with exactly those motions which they have in the real machine; the motion which in the machine itself is produced by the action of the circulating fluids, such as water and steam, being produced in the model by mechanical contrivance.

One of these models represents a marine engine, another a locomotive, and the principal one, constructed in brass, and kept in motion by means of a small working model near it, represents a stationary condensing low-pressure engine, with all its appendages, as commonly used in the arts and manufactures.

If the visitor examined carefully the movement of the parts, beginning at the piston, he observed that when that piston begins to descend, the slide which admits steam from the boiler to the top of the piston is open, as are also the passages which communicate between the bottom of the cylinder and the condenser, so that the steam urges the piston downwards against a vacuum. When it arrives at the bottom of the cylinder, he observed the slide, governing the admission and the escape of the steam, to shift its position, the bottom of the cylinder being now put in communication with the boiler and the top with the condenser, and thus the piston will be driven upwards by the pressure of the steam under it. If he then followed with his eye the passages leading to the condenser, he saw the air-pump working, and its valves opening and closing, by which the water and air are drawn from the condenser and thrown into the hot cistern. He saw, in like manner, the action of the hot and cold water pumps, the parallel motion, the governor, and, in a word, all the parts of the machine.

An intelligent and attractive observer, having some slight previous knowledge of the mechanical properties of steam, will, by a mere inspection of this model, obtain a more perfect knowledge of the steam-engine than could be acquired by days of study in books. For schools and colleges such a model in series would be invaluable.

Patent Safety Apparatus for preventing accidents in descending or ascending Mines.—Messrs. Fourdrinier, Sunderland.

This machine consists of a cage or basket, which can be employed in every way precisely as any arrangement now in use. The cage or basket is attached to guide rods or chains in the shaft, and upon the rope or chain being broken, arms forming powerful levers are liberated, and these are wedged most securely upon the guide rods. The apparatus has no chance of falling more than a few inches after the rope or chain is broken. The stop is most perfect, and so free from any violent action that no danger is to be apprehended from recoil. Another arrangement has been made by which the casualties arising from being drawn over the pulleys are entirely prevented.

Self-inking Press.—Messrs. Ransome & May, Ipswich.

This machine has a stationary table for the types. The "tympan," as it is called, which keeps the paper in its place and folds over the types, is withdrawn by turning a winch, and as the paper is removed, the inking roller advances. In this method the types are passed over once by the

roller as the tympan is withdrawn, and again when it is run in with a fresh sheet of paper. All that the pressman has to do is to put in the paper, turn the winch till it is in the proper position over the types, and pull down the handle of the press; by then reversing the direction of the winch the tympan is drawn out, and throws itself back, that the printed paper may be taken away.

Oscillating Engines.—Messrs. Penn & Son, Greenwich.

These manufacturers and engineers have obtained great celebrity for their oscillating engines. The ones here exhibited are of 12-horse power, and are contrived to act directly on the crank without the intervention of a connecting rod. The cylinders, being balanced on pivots, oscillate as the shaft revolves, and thus apply the power to turn the cranks at all points of bearing. This form of engine is not confined to the size of those exhibited, for the same makers are now constructing a pair of engines of 500-horse power for the Great Britain. There is also a feed engine for pumping water into the boilers of steam vessels when the large engines are not at work. The cylinder and pump of this machine are placed opposite each other, the piston rods being connected to the same cross head, which works in a guide, and has a vertical slot in which the crank revolves without being connected. The force of steam in the piston of the small auxiliary cylinder acts directly on the piston of the pump, and communicates rotary motion to the crank in the slot. When the pump is worked by hand, the turning of the crank gives a direct reciprocating movement to the piston without the intervention of any connecting rod.

Model of a Submerged Paddle Wheel to work wholly or partially under water.—J. Pym, 52 Threadneedle street, London.

This paddle wheel consists of a number of double blades, each resembling a flat oar radiating from the centre, the upper and lower parts being placed at right angles to each other. A screw in the axle of the wheel *takes into threads* in the centres of the blades, by which they have a rotary motion imparted to them independently of the revolution of the wheel. When resistance is required, the flat sides of the oars are turned to strike against the water; and when resistance would check propulsion, the blades are turned edgeways. This propeller, therefore, would act entirely under water; though, when partially above the surface, the resistance to the ship's motion would be less.

Self-acting feathering Paddle Wheel.—Mr. Jones.

This paddle wheel deserves notice from the simplicity of the arrangement and the effective way in which it prevents retarding resistance. The floats turn on pivots, and have stays at the back to prevent them from turning round when they are required to act against the water; but as soon as they have passed that point, and their further resistance would be detrimental, they turn and meet the water edgeways.

Model Railway Carriage, with Self-acting Collision and Railway Breaks. Model of Buildings, with Self-acting Fire Extinguisher.—
W. Macbay, royal artillery, Woolwich.

The first of these inventions consists of an atmospheric buffer, or air-tight compartment of vulcanized India rubber, or other air-tight cloth, to prevent damage by collision. This is fitted into the exact space between the carriages, thus to interpose an elastic body of about 250 cubic feet, (of air,) so that, when a collision takes place, it must be displaced before the carriages can come in contact with each other. The method of conveying the air into these rubber compartments is by two tubes, carried longitudinally on the top and near the edge, the front apertures for admitting the air being bell shaped, to admit a larger quantity. These tubes conduct the air into the compartments at the back, lifting up two valves placed on a small projection, or box, with an inclined surface of one and a half foot deep. On any compression of the air compartment, these valves shut by the reaction of air, and are forced tight on the back apertures. A valve, acting in a contrary direction, then gives immediate escape to a portion of compressed air. The more rapidly the concussion, the greater elasticity will it present, and the momentum thus expends itself in the air. If the compartment bursts, the injury will have passed off with no other damage, and this can soon be repaired.

The India rubber compartment will, however, resist a great pressure, being itself very elastic; and if there should be any doubt about that, a continuous collateral vulcanized rubber piping, of about three feet diameter, could be substituted; thus dividing the same pressure to a greater surface of resistance. The application of this invention is not intended to displace the ordinary buffers, which are still useful as secondary agents and for general purposes.

The second invention is a self-acting collision break, intended to be applied to the front and rear of every train, on the luggage car at one end, and the engine or tender on the other. The ordinary breaks act on the wheels, and cannot, therefore, be instantly applied; they can only be gradually put into action, and even then the danger must be foreseen. This break, on the contrary, is intended to act only by the violence of the collision, and against the rails, by which means a greater and more instantaneous amount of friction is applied.

By means of two wedges, the breaks are forced down, the momentum to a great extent checked, and driven vertically, instead of horizontally. The greater the weight of the car, the greater will be the resistance and efficiency of the breaks; for by means of the wedge, the weight is brought to bear against the force employed. The following is the mode of application: The buffer rods in the inside of the frame, being projected $1\frac{1}{2}$ foot beyond the point where they are connected to the plate springs, terminate with a buffer head, nearly similar to the one outside. When, from the violence of a collision, the springs are forced beyond their ordinary point of action, the inside buffers then come in contact with the two powerful wedges, as stated before, placed on each side of the centre of the frames, in the direction of the buffers; these wedges force down a shaft, which acts as a break, on both rails; so that the tendency is to wedge down the car, and thus prevent it from coming into violent collision with the next carriage. The momentum becoming vertical,

renders it necessary that additional security should be given to the break-car; for which purpose it is strengthened by a strong band of iron passing over the frame, and down each side, forming a box for the axletree of the shaft, which rests in it on a spiral spring; so that when the wedges are released, the shaft recovers its original position. Contusions may be guarded against inside by a lining of hair felt, of an inch in thickness. The other invention is a self-acting fire extinguisher. This consists of two gutta percha pipes, carried along the length of building—one on each side of the shafting roof, constantly charged with water, and of five inches diameter or upwards, having a covering of hair felt over the upper surface, and another of zinc over that, to protect it from the solar heat. Branch pipes of about one-third diameter, of iron, connected with the main pipes, are then carried down vertically along the party or partition wall of each house, or one between two houses, from whence, running horizontally, branch pipes are again conveyed to each room, about the centre of the ceiling, where it spreads out into four arms, or more, as necessary for the length or size of the room. These projecting arms terminate with an aperture, over which is screwed a gutta percha cap; this cap having a brass ring at bottom, with screw thread inside, to screw over the aperture of pipe. The object of the gutta percha caps being that they may, when a fire breaks out in any room, immediately liberate the water contained in the pipes, so that the fire may be confined to the room, and extinguished at once. Should it reach the roof, the pipes then give way, and a body of water is brought to bear on it, which must soon overpower the flames, and prevent their reaching the next houses.

The Printing Key Frame.—Invented by Foucault, Paris.

This machine is one of the most useful adaptations of mechanical science to the wants of the afflicted—an invention by which the blind are enabled to communicate their ideas by writing, or rather printing. It was shown at the Parisian exposition of 1849, and such was the appreciation in which it was held, that the inventor had the honor of receiving a gold medal at the hands of the central jury. The following extract from their report will explain the nature of this valuable invention:

“In order fully to estimate the importance of this invention, we must consider, first, the time elapsed since the want of it has been felt; and secondly, the number of experiments which have proved incapable of overcoming the difficulties to be encountered. Beheld in this double light, the writing machine for the blind, invented by M. Foucault, himself a blind man, is one of the most remarkable in the exposition.

“The praiseworthy efforts made to enable the blind to correspond with the clear-sighted, have been extremely numerous. The dependence—sometimes dangerous, and always embarrassing—on a strange hand, has ceased for them—thanks to M. Foucault; for the acknowledgment of this emancipation, consecrated by several years’ experience, is no longer an object of doubt. Of all means calculated to give the graphic expression to the ideas of the blind, the inventor has selected that which may be considered the simplest and most perfect. The blind who make use of this invention are placed in circumstances perhaps even more favorable than the clear sighted, since they are enabled

to write without having ever learned how to form a single letter. It is sufficient to know how to read by the touch to be capable of expressing their ideas in an eminently legible manner, inasmuch as the letters are in typographic characters. The following is the process employed to obtain this curious result: all letters of the alphabet, executed in relief, and of considerable dimensions, are fixed on the upper extremity of a metallic rod, made to slide longitudinally in a proper contiguous canal; they are placed on the same plane and in the form of a fan, each of them exhibiting on its lower part the same letter as on its upper. This letter, of a small size, is exactly a printing character. The mechanism is so disposed that all the letters converge towards the same point, and, on being successively pressed by the fingers, their impresses become superposed, forming only a black mass; but whenever a letter is touched, the paper, by the same impulsion, changes its place, and then is produced the writing—clear, well ranged, and properly spaced. The line terminated, the paper changes place in a perpendicular direction to the former, and the operation is renewed.

“Besides this a series of types, forming ciphers and all the complimentary marks of writing, is placed in the same way, and in a plane convergent with the former; for the general principle of this machine is, that all the types, whatever their order may have been at first, set their impress on the same point. Of all the methods known for the obtaining of graphic characters, M. Foucault has preferred the use of tracing-paper, such as is employed in copying-machines. The whole of this valuable machine consists of a construction perfectly portable, and an extremely simple though rapid manipulation.”

It appears that the inventor was a long time perfecting his machine, and that the present is the latest improvement on a series of similar inventions, the whole of which were intended to promote the same philanthropic object—teaching the blind to write. In 1850, the Board of Encouragement in Paris awarded the inventor, who was a pupil of the Institution for the Blind in that city, a second gold medal; and there is little doubt, such is the intrinsic worth and simplicity of the machine, that it will speedily come into use among the blind of all countries. Its cost is, we believe, about £20.

Model of Patent Railway Junction Semaphore Signals, and Double Station Signal.—Stevens & Son, London.

The semaphores, constructed on English railways, consist of an upright mast, varying in altitude according to circumstances, with fan-like arms attached, which, in the day time, convey the desired information to the engine drivers. At night, and in foggy weather, lamps are used, having red, green, and white glasses, to signify, respectively, danger, caution, and “all right.”

The model forming the double station signal consists of two semaphores, and is employed at junctions where it is obviously necessary that special precautions should be observed to prevent collisions. By the side of the semaphores there is a wooden cottage for the policeman on duty, and a platform, with apparatus, for working the signals and for shifting the points. The ladders and gallery on top of the mast are for conveniently lighting and trimming the lamps. In order better to com-

prehend the value of this invention, let us suppose, on each of two railways which form a junction, that a train is advancing. If the arms, or fans, in each of the posts are stretched out, forming right-angles with the posts, both trains would be immediately stopped; but by the policeman putting his foot into a kind of stirrup, four of which are arranged side by side, one of the arms is lowered, and the train, thus signalled, would proceed, while the policeman, by means of the handles in front of him, shifts the points, if necessary. Through the agency of the entire mechanism a person, with perfect ease, can regulate the movements of four trains advancing simultaneously.

Sorrup's patent Passengers' Railway and Steamboat Time Signal.—
Manufactured by R. Sidmarch, London.

This signal consists of a copper ball, 18 inches in diameter, descending down a pole or pillar, 16 feet high, (at night lit up with lamps, according to locality,) and occupying ten minutes in its descent. It is wound up to the top by clock-work immediately a train has passed, thus showing to the engine driver of the next train, at one view, how far the train preceding him had gone on, by the distance the ball had travelled down the pole. The signal is thus an unmistakeable guide to engine drivers, instructing them to shut off the steam, or otherwise, according to circumstances.

The very great superiority of this signal over all others in present use, for the purpose referred to, is very apparent, for it is of the utmost consequence that the engine driver should not only be made aware when a train is in proximity to his own, but how far it is from him; and this signal is, so far, the only method by which both these important points can at once be attained—and that in a way which cannot be mistaken. Even when passing this signal at full speed, the action of the apparatus is quite apparent; and from its construction is not likely to get out of order. It has attracted much attention from scientific men, and has been approved of by the Scotch Society of Arts, who, at their last annual meeting, on the recommendation of a committee, consisting of the most eminent engineers in Edinburgh, awarded their silver medal to the inventor, in testimony of their high sense of its merits.

It is undoubtedly one of the most complete instruments yet invented for effecting the object desired, and as a means of preventing those serious accidents—far more frequently occurring in Great Britain than with us—by the collision of railway trains.

The time of the descent of the ball or light having been uniformly fixed on all railways at ten minutes, engine drivers, removing from one line to another, would always be guided by one and the same rule of time. The signal may be easily placed on the highest elevation of a building, bridge, &c.

Model of a Colliery, with Engine, &c., representing the Coal Mines of Durham and Northumberland.—Messrs. Bradley, Wakefield, Yorkshire.

No one, even amongst those who have themselves practically explored coal mines, can fail to be struck with the clearness of perception which is obtained of such works from this model. Thus we have, first, those

parts of the works which are above ground exhibited—such as the mouths of the shafts, and the engines which work them. There is, first, the shaft by which the coal is raised; next, that by which the mine is drained; and, third, that by which it is ventilated. This latter process is usually accomplished by a furnace, which creates a draught of air up one of the shafts; which is necessarily followed by currents of air down the others.

In the lower part of the model is exhibited the state of the workings. The beds of unworked coal are represented by a black stratum, the workings being exhibited by cuttings through it; the railways being shown upon which the wagons move, in which the coal is brought to the bottom of the shaft, through which it is elevated by the power of the steam engine erected at the top.

The partitions, and other contrivances to regulate the ventilation of the works, are represented by brick-work. The timber supports used for sustaining the roof of the workings are also shown.

Coal mines, or coal fields, as they are sometimes called, differ in the thickness of the bed of coal, and in the position in which it lies. In some, the thickness does not exceed 18 inches; in others, it amounts to many feet. In the coal fields of Durham and Northumberland the average thickness is 12 feet; and consequently each acre contains 19,360 cubic yards of coal, each cubic yard weighing on an average one ton.

The extent of the coal area in Northumberland and Durham is, in round numbers, 500,000 acres, and, consequently, its total contents amount to not less than 10,000,000,000 tons of coal; of which 1,500,000,000 only have been worked.

The present annual consumption of coal in the Kingdom is estimated at 10,000,000 tons, including the waste; it therefore follows that, at this rate, it would take above 800 years to exhaust this single field.

Not the least remarkable circumstance suggested by this model is the prodigious depth at which this subterranean industry is carried on. In some cases the depth of the workings is 1,800 perpendicular feet, or one-third of a mile.

The apparatus for the ventilation of the mine is extremely important, inasmuch as upon its efficiency the safety of the men engaged in working the mine mainly depends. The gas, which, by artificial processes, is extracted from the coal for the purpose of illumination, is found to issue spontaneously from the coal in the mine in more or less quantity; so much so, that by holding a candle against the walls of the workings, jets of flame may be often produced. When the gas is mixed in a certain proportion with atmospheric air, which fills the workings, a mixture highly explosive is produced; and if a flame or spark comes in contact with it, a destructive catastrophe ensues. Good ventilation prevents this evil. The current of air kept continually flowing through the workings, descending at one shaft and rising at another, is a safeguard against this evil; but as this ventilation sometimes fails, a further security is afforded in the safety lamp, which, as is generally known, is a lantern surrounded with fine wire gauze, instead of glass or horn. This wire gauze has the property of preventing the passage of flame through it. Flame is nothing more or less than gas rendered luminous by intense heat. In passing through the wire gauze it parts with so much of its heat to the metal of

the wire, that when it has issued from the meshes, it loses the character of flame and is incapable of producing explosion.

The object of the contributors is to exhibit the most practical and safe method of working, raising, and preparing coal, combining those improvements which are the most economical and efficient. It will be observed that instead of having two engines, one to raise coal and the other to pump water, the whole is concentrated in one double acting horizontal high-pressure steam engine, which continually moves one way, the alternating motion of the pulling apparatus being obtained by the operation of a pair of conical drums, which screw one into the other, alternately.

By this arrangement the disadvantage of reserving the water pumping machinery is obviated, securing to it a continuous motion, which is of considerable moment. The advantage of landing the coal at the top of the pit consists in the safety and economy of labor. The cars are run out of the cages, not at the front of the head gear, as is usual, but on each side direct on to the tips, and turned over.

The coal runs down the screens, which are erected on each side of the pit, the train rails being laid below on the surface, over which the wagons run, to receive the coal when prepared for sale. The screens are so constructed that every facility is given to pick out any shale or dross, and render them perfectly clean.

Fire Engine.—Built by Messrs. Perry, Montreal.

This engine differs very materially from those now in use in England, inasmuch as it is erected to work transversely, in place of longitudinally. It is said to combine with lightness and neatness greater power than any similar engine in Europe; whilst the simplicity of its construction enables it to be worked with fewer men and more ease. It is also equally suitable for hot or cold climates, which the English engines are not. These are by the builder said to be the principal merits of this engine, though its capabilities have been as yet but partially tested. Estimating these, however, by other engines, built on a similar principle, and at work in Canada, the following are considered to be within its range: with a cylinder of seven inches, and a stroke of sixteen, it will lift a supply of water thirty feet, and, playing from the extremity of a fifty-feet hose, it will send a jet from a one-inch nozzle from 170 to 180 feet vertically, and 210 feet horizontally, or it will send two streams, each 150 feet vertically, and 170 feet horizontally. In the building of the engine exhibited, every evidence of care has been bestowed, and it is adorned with paintings of the principal edifices in Montreal, and others of minor description. It was with extreme regret that I announced, upon my second arrival from New York, that no fire engine would come from that city. In efficiency, power, adaptation, and general construction, our engines for extinguishing fires are far superior to any which are used in Great Britain or on the continent.

Fire Engine.—Mr. Merryweather, Long-acre, London.

This engine appears to be ingenious. It is called a cabinet fire engine, and notwithstanding the different forms which fire engines have been made to assume since their first invention, (about two hundred years

ago,) the appearance of this shows that variety is not exhausted. This engine was produced at the request of the Duke of Norfolk, and is one of the most compact and efficient ever constructed here. In outward appearance it resembles a small cabinet upon castors, and upon removing the mahogany top, a complete fire engine is discovered, worked by a folding handle, with an apparatus capable of being rendered available at a moment's notice. The strength of one woman is sufficient to work it, and the whole does not occupy a space exceeding thirty square inches. There is also another engine by the same maker, called the farmer's engine, a branch pipe of which is furnished with a spreader, by means of which the water can be thrown over a large surface—an invaluable appendage in the event of fire in corn or hay stacks, &c.

First-class patent Passenger Locomotive Engine.—K. & W. Hawthorn, Newcastle-upon-Tyne.

As this engine embodies three new patent improvements in railway locomotion, which appear to be of great practical value, we shall give these improvements in detail, from the description published by the manufacturers. The cylinders are sixteen inches diameter; stroke of piston, twenty-two inches; driving wheels, six and a half feet diameter; leading and trailing wheels, three feet nine inches diameter; heating surface of fire box above the grate bars, exclusive of tube ends and fire door, 98.6 square feet. Total area of fire box, including tube ends, fire door, and surface, below the upper side of grate bars, 110 square feet, (the fire box has a bridge, with space across the centre;) 158 brass tubes, two inches exterior diameter, having a heating surface of 865.4 feet—the maximum speed, with an average express train, being equal to 89 miles an hour on a good line.

The patent improvements introduced in this engine are: first, the patent double compensating beams. The compensating beams and springs (two beams and two springs on each side) are introduced, instead of the six ordinary springs, one to each axle bearing, by which arrangement all the axle bearings are so connected that whatever action takes place will be directly and simultaneously distributed over the six wheels and axles, by which means a uniform weight is constantly maintained upon all the wheels, no matter what imperfections or irregularities in the line of railway; securing thereby a constant amount of weight upon the driving wheels for adhesion, which is of great importance for a first-class engine, wherein the power is communicated to one pair of wheels; and which, in practice, is often found deficient, and attended with great inconvenience in engines with the ordinary six springs. The mode of connexion between the axles above mentioned gives great stability and easy motion to the engine, which was fully proved in the transit of the engine by rail from Newcastle to London, and particularly when running at high speeds. In addition to the advantages hereby given to the engine itself, considerable saving is effected in maintaining the permanent line of railway. In the "Hawthorn" the axles have all outside bearings, with driving wheels in the centre, and the carrying wheels at each end, (the trailing axle immediately behind the fire box,) which arrangement of wheels and axles has, with a very few exceptions, been adopted by the first engineers and locomotive-engine manufacturers, as being the best in principle for first-class passenger or express engines.

Although the necessity of having, at times, to put an undue weight upon the springs of the driving wheels, in an engine with the ordinary six springs, to secure the required adhesion, operates considerably against the arrangement, by giving to the engine an undulating or pitching motion, which at times renders it unsafe, and particularly so at high velocities, the permanent way is also more or less injured; which would be wholly removed by the double compensating beams. Occasionally, engines have been made with the driving wheels placed behind, and the motion communicated thereto by outside connecting rods, through the medium of a distinct crank axle; but the driving wheels, being so placed, curtail the foot plate, and render it very inconvenient to the engine driver and stoker; and the outside connecting rods have almost invariably been considered objectionable, and attended with less or more danger to passenger engines, particularly when running at high velocities.

Secondly. The patent slide valves, which may be made either of brass or cast iron, are placed vertically between the cylinders in one steam chest, in the usual manner. One slide valve has a plate, cast or bolted upon the back, which is planed parallel with the face of the valve. The other slide valve has a box cast upon the back, into which is fitted a projection or piston. The face of this piston is also planed parallel with the face of the valve, and packed in the most simple manner, and made steam-tight. The slide valves are then put into the steam chest, as in ordinary valves; the plate and piston work against each other steam-tight; and the trifling movement of the piston will insure the packing keeping perfectly tight for a great length of time, and, when required to be renewed, it is only necessary to remove one of the steam chest bonnets and draw out the valves. A passage is formed between the exhaust ports through the slide valves, thus giving a free discharge to the steam. By this arrangement of patent slide valves, they are relieved from one-half the pressure of steam, and consequently one-half the friction and power to work them, and also a like proportion of the wear and tear of the faces and gearing.

Thirdly. Their patent link motion is also introduced into this engine. The link, (called the expansion link,) instead of being connected to the ends of the eccentric rods, and moved up and down with them, (which, with the great weight of the link, requires very strong gearing,) is directly connected by an eye-joint to the slide rod, and there suspended; hence its weight is removed from the reversing gear. By the link having thus a fixed centre, less power is required to reverse and regulate the slide valves, and the action of the valves are more correct, particularly when cutting off the steam and working expansively; the link is also much more durable by admitting of what is termed the sliding block; being more than three times the length of the ordinary block; hence a great saving in the wear and tear of the link and gearing. Another important advantage is that the link permits of the boiler being brought down nearer to the axles.

Fourthly. Their patent steam pipe is likewise here introduced, which does away with all domes or cumbrous projections on the top of the boiler. The pipe is fixed into the tube plate of the smoke box by a ferrule, like an ordinary tube, and extends nearly the full length of the boiler near to the top; it is perforated with a series of small apertures or slits along the entire length, so proportioned as to admit the steam into

the pipe directly above where it is generated, instead of having to rush from all parts of the boiler to one or two orifices, so that the steam is carried to the cylinders more pure, and *priming*, as technically termed, is prevented to a great extent. Both the inside and outside framing extend the full length of the engine, and are firmly tied together by strong iron double-knee brackets on the cylinders, guide bars, pumps, axles, &c. In short, the whole machinery of the engine is perfectly fitted and fixed entirely independent of the boiler; and when so completed, and the wheels and axles put into their respective places, the boiler is then, but not till then, put in its place and firmly secured by bolts to the double-knee brackets above mentioned and the outside framing.

Portable Machine.—M. Baranowski, Paris.

This machine is for the purpose of printing, numbering, and registering tickets for railways, theatres, &c., at the rate of 5,000 per hour. A number of blank cards are placed in the upper part of this machine, and then, by turning the handle, either by hand or steam power, the cards are delivered, one by one, ready for distribution—namely, printed from an adopted form, and numbering from one to 3,000 or more. At the same time each ticket is registered as it leaves the machine. The printing, as well as the numbering, is done with common type, in different colors. Each ticket is further checked by marks or symbols, which, if necessary, may be transposed.

Model of a State Railway Carriage, with Promenade round the outside.—R. Melling, London.

The length of this carriage is 2 feet 8 inches; the breadth, 1 foot 1 inch; the length of platform round the carriage, 3 feet 9 inches; and the breadth, 1 foot 5 inches. The interior of the carriage consists of three compartments—a centre, or throne room, and a saloon at each end. The thrones and couches are of mahogany, cushioned with light scarlet velvet, and trimmed with lace to match. The doors and compartments are glazed, and have movable sashes. The body is painted a neat brown color, and has circular ends.

The carriage is supported by eight wheels. At first sight, it would appear that a carriage of such length as to require four pairs of wheels would not be calculated to turn curves with safety. This difficulty is overcome by placing two pairs of wheels near to each end of the carriage, having a considerable space in the centre. This arrangement allows it to turn a curve with nearly the same facility as if it had but two pairs of wheels, while it gives the advantage of much less oscillation, and adds greatly to the security; for if any particular wheel should fail—by the tire of the engine wheel breaking—the remaining wheel at that end of the carriage would still support it.

The Fire Annihilator.—Patented by Philips, London.

In remarking upon the efficacy of the fire annihilator for extinguishing fires in houses and buildings, Mr. Philips states: “That the origin and continuance of flame depend on two conditions—first, that the

combustible material should be raised to and kept at a temperature high enough to afford a constant supply of inflammable gas; and, second, that it should be constantly fed with pure air. The usual remedy against fire is water. But water is able to interfere with the first of these conditions only. Unless the burning substance be so saturated with water that it cannot give out combustible gas within a very few minutes after it has been set on fire, the heat of the flame first extends and then ignites other inflammable gases and vapors from various parts of the room; the flames are thus dispersed about the apartments, and, by the time the engine arrives, the contents of the house are frequently consumed. We therefore propose to subdue the flame by effectually disturbing the second condition of its continuance—access of pure air. This object will be accomplished by diffusing through the atmosphere (already vitiated by the combustion) of an apartment on fire a quantity of carbonic gas and steam, and thus render the continuance of flame impossible. These gases and vapors are generated in a portable apparatus, which, when intended for the protection of private dwellings, weighs from twenty to thirty pounds; and the construction is such that the æriform fluids can be evolved in less than three seconds on touching a spring.

The great advantages possessed by the gas over water were as follows: The gas was evolved at a temperature of about 160° Fahrenheit, and came in contact with flame having a temperature of about 3,000°, and under which temperature it could not exist. The gas absorbed part of this heat, and not only in proportion to its original volume, but expanded as much as a hundred times more, each part still retaining highly absorbent powers. Now, water thrown into a body of flame only acts on the part immediately in contact with it; and although it might be used at (say) 32° Fah., much lower than the gas, yet it was found that a very small part assumed the form of vapor on coming in contact with flame, and, spread through it, the greater quantity fell down by its superior weight and was wasted.

A public demonstration of this patent took place in the early part of the present year. The fire annihilator used on this occasion was less in size than an upright coal scuttle, and consisted of a machine composed of four tin or thin iron cylindrical cases, within one another, the central case containing a chemical preparation, in the form of a brick, composed of charcoal, nitre, and gypsum, which, whenever occasion requires, will discharge, with the power of steam, a vapor in which flame cannot exist. In the centre of this inner case is a small hole to receive a phial of the chemical compound, which fires the inside substance, and creates the vapor, on a pin being pressed down from the top and the lid screwed down. The first experiment was on a large jet of gas, upon which water was poured, which had no effect; but on applying a machine, not larger than a half-pint tumbler, charged with vapor, the flame was extinguished in about three seconds. A small model of a house was crowded with combustible materials, saturated with turpentine, &c.; the door was closed, and the flames rapidly ascended to the roof. Here Mr. Philips showed that the gas given out by the flame or smoke was such as not to allow a person to breathe, and hence suffocation frequently followed when fires occurred. On applying a light to the windows, &c., whence the smoke issued, it was immediately run out. The same small machine, as we have before described, on the door being opened, was introduced, and

the flames were extinguished as if by magic. The whole of the interior was instantly purified, the light was again applied, and burned brilliantly.

At the end of the building in which the experiments were made, a building, of wood, was raised, of the ordinary height, size, and appearance of a four-roomed house, and in the interior were placed planks covered and well paid with tar, turpentine, &c. On being set fire to, the flames ascended with wonderful rapidity, and roared loudly. While the flames were at their height, the annihilator, of the large size we have mentioned, was brought to bear upon them—the party carrying it boldly going into the midst of the smoke. In five seconds the whole was extinguished; and in another second Mr. Philips and the man who assisted him were seen on the top of the building—the one holding a light in his hand.

Another demonstration was also made as to the efficiency of the annihilator for extinguishing fires in ships, &c. The vessel on which the experiment was made, the *Wear*, of 150 tons, was laid close alongside Blackwall pier, and the whole of the arrangements were made in the presence of a numerous concourse of persons. The hold of the vessel was filled with pitch, tar, turpentine, saltpetre, and rosin barrels, plentifully intermixed with shavings and other combustible materials. At a signal from the patentee, this mass of inflammable matter was ignited at the bottom, and the hatchway closed on deck for about five minutes, in order to give the fire time to spread and take a thorough hold. On the removal of the covering, upon the admission of the external atmosphere, the flames immediately made their appearance, and, aided by a brisk wind which was blowing at the time, ascended to a great height. The fire was allowed to burn with great fierceness for some minutes, in order to show the perfect command over it which is conferred by Mr. Philips's invention; though, as he remarked, in the case of fire taking place on board a vessel at sea, no time would be allowed for it to spread, and there need not be any large or continuous admission of external air to feed the flame. This was merely done on board the *Wear* to prove the capabilities of the invention under the most adverse circumstances. In about ten minutes from the commencement of the fire, and when the flames were about their greatest height, two of the machines were brought to bear upon it, and discharged the gas with which they were filled into the hold with great force. The effect was instantaneous. The flames sank beneath the deck immediately, and, by the application of two more machines, the fire was thoroughly extinguished in about twenty-five minutes from the time it was kindled.

With a proper supply of machines, and the prepared material, it is apparent that the spread of fire on board of vessels, either in dock or at sea, would be rendered all but impossible; and it is stated by the patentee that the cost of both would amount to a comparatively trifling per-centage on the tonnage and cargo of sea going ships, with this advantage—that the material from which the gases are eliminated, being solid, can be easily kept in boxes, or on shelves, and does not deteriorate by exposure to any climate.

Another and most important peculiarity connected with this invention is the rapidity with which persons may enter the hold of a ship, or the interior of a house, immediately after the fire is subdued, without any defence or covering, and without any danger of being suffocated by the smoke arising from the smouldering and charred materials.

CLASS 2.—MANUFACTURING MACHINES AND TOOLS.

Under this head were included manufacturing machines, tools, and implements employed in the production of spun, woven, felted, and laid fabrics, and in the manufacture of vegetable and animal substances—all the varieties of machinery necessary for the production of the fabrics from the following raw materials: cotton, wool, flax, hemp, silk, caoutchouc, gutta percha, and hair, as also those used in paper-making, printing, and book-binding. It also comprised the vast range of manufactures in metals, and the machinery and apparatus used for brewing and distilling.

Machinery for the manufacture of Cotton.

The cotton machinery formed one of the most important and interesting features in this department of the Exhibition, and was represented in a manner commensurate with its importance. The extension of this branch of manufacture has been far more rapid in England than in any other country. Before Arkwright's time, it was the custom for the weavers, who were dispersed in cottages throughout the manufacturing districts, to purchase the material with which they worked, and, having converted it into cloth, to carry their wares into market and sell them on their own account to the dealers; but about 1760 the merchants of Manchester began to employ the weavers, furnishing them with yarn for warp, and with raw cotton, which was spun by the weaver's family for the weft, paying a fixed price for the labor bestowed in weaving.

The fly-shuttle came into general use about 1760. It was invented by John Kay, in 1738, simply consisting in the weaver chucking the shuttle backward and forward through the warp, by means of strings in each hand. This was a decided improvement over the old machines then in use, as one man could then weave cloth of the same width that previously required two.

The impossibility of producing a greater quantity and better quality of yarn formed a serious hindrance to the further progress of the manufacture. One pair of hands being able to spin one thread only, rendered the operation slow and expensive until a machine was invented by which from twenty to a thousand threads could be spun at once.

John Wyath was the inventor of this wonderful machine, generally known as the mode of "spinning by rollers." The first process in the manufacture of cotton, before it is spun, is to clean it, and then pass it through the carding machine. Carding consists in combing the cotton—that is, disentangling and straightening the fibres. When the cotton leaves the carding machine, it is in loose rolls, called slivers. The operation of spinning consists in drawing out the cotton—that is, reducing the sliver and then twisting it into a thread. In the machine which Wyath invented the sliver passed between two rollers, which revolved at a certain speed, and again passed between two other rollers, revolving at four or five times the speed of the first. By this means the sliver was drawn out in proportion to the difference of speed between the two sets of rollers, and, after being thus reduced, the cotton was twisted and wound on a bobbin.

In the year 1770, Hargreaves took out a patent for the spinning jenny. It is said that Hargreaves got the idea from seeing a one-thread machine overturned upon the floor, when both wheel and spindle continued to revolve. This threw the spindle from a horizontal into an upright position. It then struck him that a number of threads might be spun at once by having a number of spindles placed side by side in an upright position. The spinning jenny, therefore, is a machine by which the roving, which is a loosely twisted thread, about the thickness of the wick of a candle, is drawn out and spun into a fine thread, or, as is technically termed, yarn.

In 1776, Samuel Compton invented the mule. This machine is a combination of Arkwright's water frame and Hargreaves's jenny, its distinguishing feature being that the spindles recede from the rollers, so that not only is the cotton drawn out between the rollers, but it is further drawn out when in the act of being spun; a finer quality of yarn being thus obtained. When the threads had been drawn out from four to five feet, the spindles were drawn up to the rollers; the threads being wound up on the spindles.

The throstle, which is merely an improvement on Arkwright's water-frame, is still much used in England among cotton spinners, though at one time it was thought likely to be entirely superseded by the mule. When the power-loom came into use, it was found advantageous to use worst of a stronger and smoother quality—a kind of spinning better suited to the water-frame than the mule. The water-frame, in its improved form, takes the name of throstle; the spindles on each side of the machine form one long cylinder by means of belts passing from the cylinder to the spindles.

Messrs. Hebbert, Platt, & Son, of Oldham, at a very large expenditure of time and money, illustrated the processes of manufacture from the cotton as it is taken out of the bale in its raw state to the time of its completion, in the form of calico, twills, &c. The preparatory process of mixing the contents of different bales, for the purpose of equalizing the quality, was first exhibited. This is done by spreading out their contents, forming separate layers, and resting one upon the other. The cotton, of which this heap is composed, is then torn down by a rake from top to bottom. It is evident that, in its progress, a portion of each horizontal layer will be brought away; and that thus, if the work be skillfully done, the contents of the different bales must be collected together in a mass of uniform quality. The mode of conducting the mixing depends on the quality of yarn required.

The next stage through which the raw material passes is the "scutching machine," which is used to open the lock of cotton, and separate its fabrics; while, at the same time, it separates from it any sand or seeds which it may contain. This machine consists of feeding rollers, made of wood, and placed at a short distance from each other, through which the cotton is made to pass slowly. After passing through the rollers, the cotton is struck by a set of beaters, made to revolve 1,000 or more times in a minute. The cotton is passed through two sets of rollers, and subjected to two sets of beaters.

Up to this stage the fibres of the cotton cross each other in every direction. The use of the "carding engine" is to disentangle them, to draw them out, and to lay them parallel to each other. It is then taken

to the next machine, called a "lap machine." Its object is the drawing of the cotton, or arranging the fibres longitudinally, in a uniform and parallel direction, and to remedy all existing inequalities in the thickness of the sliver. The drawing frame acts with two sets of rollers, moving with unequal velocities. The cotton is drawn several times to attain the utmost regularity.

The next step in the process is "roving," which is a continuation of the drawing, with this only difference: that the cord, now called a "rove," or "club," being so much reduced in thickness that it will not otherwise hold together, a slight twist is given to it by passing it into a conical can, which, while receiving it, is made to revolve with great velocity. The rove, thus slightly twisted, is wound upon bobbins, and is then ready for the spinning frame. The "mule" is the machine next in order. Here the bobbins taken from the roving frame are again passed through three lines of smaller drawing rollers, and then delivered on to the points of the spindles, which, by their rapid revolution at the time the carriage is drawn out, twist the roving into yarn. On the return of the carriage, the twisting operation ceases for a time, and the newly-spun yarn is wound on to the spindles in the well known form of "cops." One of the mules here exhibited is a weft mule, with tin rollers; the other is a warp or twist mule, but with drums, instead of the rollers, to show the variety of mechanism. The twist mule has also a back shaft the whole length of the machine, instead of squaring bands, as in the weft mule, for the same reason. All the bearings are constructed with unusual solidity, on the patent principle of the exhibitors, as also the adjustable spring for "backing off," and the adjustable catch box in the front roller, for preventing "snarls."

The doubling frame is the next machine, and is used to twist two yarns together into one thread for strong warps, as stocking yarns, and also for sewing cotton. The winding machine follows, and is shown with two sorts of arrangement—that for winding twist mule cops on one side, and that for throstle bobbins on the other. Both these are wound on to large bobbins, ready for the next machine, which is called the beaming or warping machine. It is fitted up in the same superior style as the other; and has Kenworth's patent rods. Here the warp is transferred from the large bobbins to the warp beams, or rollers, ready for the dressing machine, which, however, is not shown in this series, as it is a machine requiring a room to itself, to prevent the steam employed from being a detriment to the other mechanism.

The dressing process consists in dressing or coating the warp threads with a paste made from flour, to stiffen the threads for the looms.

The looms are the machines which follow, where the yarns, both weft and warp, are woven into cloth. Four looms were exhibited for making plain cloth or calico, to which the jacquard apparatus can be attached for weaving fancy goods. All the looms have the patent taking-up motion of this form, and are all adapted both for plain work or twill.

The development of this extensive branch of industry (the cotton trade) in Great Britain may be estimated from the fact that the quantity of raw cotton consumed by the manufacturers in 1850 was 584,200,000 pounds, or nearly 900 tons per day.

The total number of cotton factories is 1,932, containing 20,977,017 spindles, and 249,627 power-looms. The moving power in these facto-

ries is supplied by steam, representing 71,005-horse power, and water, 11,550-horse power; the total number of persons employed in these factories amounting to 330,924. If to these we add the persons not employed in factories, such as hand-loom weavers, calico printers, and dyers, makers and repairers of machinery, &c., a total of 700,000 would be obtained.

The total value of the cotton goods and yarn exported in 1850 was £28,252,378; and the capital employed in the cotton manufactures of England is estimated at not less than £45,000,000.

Centrifugal Machines for washing and drying Clothes, for drying Starch, and purifying Sugar.—Messrs. Manlone & Co., Nottingham, inventors.

The patentees of this valuable invention claim for it the property of completely overcoming the disadvantages arising from wringing or squeezing wet garments, and also of effecting the drying of any material much more speedily and effectually than has hitherto been deemed possible. The peculiar advantages possessed by this over all other machines in use by calico printers, bleachers, dyers, &c., are thus adverted to: The goods are not injured in the slightest degree. The only pressure or force to which they are subjected is that of the different folds of the fabrics on each other by virtue of their centrifugal tendency; and this, even in the finest and most delicate material, does not produce the slightest abrasion in the texture, or rupture in the threads; at the same time all creases are entirely avoided, and, in case of very fine yarns of silk or cotton, the difficulty that arises from the adhesion of their fibres, wringing, or other pressure, is completely prevented.

The liquid or moisture is so completely and so uniformly abstracted by this process, however heavy the fabric, that only a very slight degree of heat is required to complete the drying; and, in most cases, the goods are sufficiently dry for the finishing process; and in consequence of less heat being required for drying, the injury so frequently occasioned to the colors, and also to the fabric, is thus avoided.

In the finishing process, when a certain and determinate quantity of moisture, starch, soap, or other article, is desired to be left in the goods, the quantity of such article can be fixed with an equality and exactness not otherwise attainable, the machine being so arranged that the speed, and therefore the effect, can be calculated at pleasure from 200 to 2,000 revolutions per minute.

In some dyeing processes, where expensive materials are employed, a considerable saving has been effected, as a larger quantity of such material can be extracted by this than by any other means; and where fancy or fugitive colors are employed on weaving articles, regularity of color is obtained in the drying that could not be previously had. It is well known that in the domestic operation of drying, the destruction of the clothes, from wringing or squeezing after washing, (the method now generally adopted,) is often greater than even the natural wear of the same. This invention will entirely put an end to such mischief; the clothes being placed, with all the water in them, directly therein, and after five minutes' working taken out nearly dry, without having been subject to the least strain on their fibres; indeed, the finest materials,

such as silks, gauzes, crapes, or fine muslins, on being examined, do not show the least displacement in their texture.

The hydro-extractor, as it is called, is made of various sizes, being calculated to hold from 100 pounds to 300 pounds of wet goods. It is most commonly worked by steam power; but hand-machines are constantly in use in hospitals, asylums, and work-houses, domestic and other establishments in which steam or water power cannot be obtained. They are made to hold six pairs of sheets at once, or any quantity of smaller articles of similar bulk, and the time required for the operation is not, in any case, more than five minutes.

Patent Folding Machine for folding Paper, Linen, or Cloth, by means of a series of serrated steel Folders.—J. Black, Edinburgh, inventor.

The appearance of this machine is that of a large box or table, with some few wheels and rollers in front. Its construction is so simple that there is very little to describe beyond the fact that inside the box are a number of knives or folders, which act in a similar manner to the one on the top, taking the sheet of paper and doubling it together, according to the number of pages, till it comes out of the machine, from the four rollers in front of it, a perfectly folded and pressed portion of a book ready for the binder. It is capable of folding any number of sheets, of any size, (which can be laid on by one or two boys,) with the most perfect accuracy. Its advantages consist not only in economizing the expense of labor, but also in space, the machine taking up no more room than would be occupied by two individuals folding by the old method. The machine can be worked by steam power, or one man at the wheel could propel six machines. Besides newspapers, it can be applied to the folding of note and other paper at the mill at the rate of 2,000 or more quires per hour.

Micrometric Apparatus, Self-acting Lathes, Planing, Slotting, Drilling, and Boring, &c., Machines: J. Whitwreth & Co., Manchester.

The first mentioned apparatus has been successfully applied to purposes of the greatest practical utility by affording means for the establishing uniform standard of magnitude for taps, axles, and other important component parts of machinery, among which it is as necessary to maintain uniformity as it is to have a uniform language or a uniform system of numeration. By this instrument magnitudes so minute as even to elude the microscope have been submitted to mechanical measurement, and magnitudes so minute as not to exceed the one-millionth part of an inch are actually estimated.

Two perfectly plane and smooth metallic surfaces are first formed, partly by friction against each other, and partly by abrasion with a peculiar tool. So plain are the surfaces of metal thus formed, that when one is laid upon the other no one part comes in closer contact than another, and there is included between them a stratum of particles of air, which act like infinitely smooth rollers, and the surfaces move in contact with one another with a degree of freedom, owing to the lubricity of the air, which must be felt to be conceived. If, however, the surfaces be so severely pressed against each other as to exclude the air, the contact becomes so complete that it is with great difficulty they can be separated. These surfaces, thus accurately formed, are used as standards

to test other plain surfaces, and with these are tested the ends of a standard measure of metal, which is placed in an accurately-formed horizontal metallic bed, one end bearing against a metallic pin. Another metallic pin, urged by a screw, presses against the other end; and if this metallic bar, by a change of temperature, or any other cause, suffers a change in its length amounting to the millionth part of an inch, that change is rendered perceptible by the following arrangement:

The pin which bears against its extremity is moved by a screw which has ten threads to the inch. On the head of this screw is a wheel, consisting of 400 teeth, which works in a worm driven by another wheel, the rim of which is divided into 250 visible parts. Now, since each thread of the original corresponds to the one-tenth part of an inch, each tooth of the wheel upon its head will correspond to the four-thousandth part of an inch, and each division of the wheel attached to the worm will correspond to the millionth part of an inch.

It is found, in the application of this apparatus, that a change in the position of the wheel attached to the worm, through one of the 250 divisions, is rendered sensible at the point of the screw which bears against the standard bar; but, since the motion of the former wheel through one division can produce a motion amounting only to the millionth part of an inch in the point of the screw, this magnitude is thus rendered sensible.

To prove the accuracy of this micrometric apparatus, a standard yard-measure, made of a bar of steel, about three-quarters of an inch square, having both threads rendered perfectly true, was placed in it. One end of the bar was then placed in contact with the face of the machine, and at the other end, between it and the other face of the machine, was interposed a small flat piece of steel, termed, by the experimenter, "the contact piece," whose sides were also rendered perfectly true and parallel. Each division on the micrometer represented the one millionth part of an inch, and each time the micrometer was moved only one division forward, the experimenter raised the contact-piece, allowing it to descend across the end of the bar by its own gravity only. This was repeated until the closer proximation of the surfaces prevented the contact piece from descending when the measure was completed, and the number on the micrometer represented the dead length of the standard-bar to the one-millionth part of an inch. Eight repetitions of the experiment in a quarter of an hour produced identical results—there not being, in any single case, a variation of one-millionth part of an inch.

This method of operating was termed "the system of proof by the contact of perfectly true surfaces and gravity;" and in connexion with it was shown another interesting experiment: when the micrometer was up within one division of the number where contact would be presumed to occur, the application of the finger to the centre of the steel bar sufficed to expand and lengthen it instantaneously, so as to prevent the descent of the "contact-piece."

The other method of proof was by having a small, simple battery, composed of a piece of zinc soldered on to a piece of copper, and plunged into rain water, without the admixture of any acid. This was connected with the two ends of the measuring machine, and also with a delicate galvanometer. On pursuing the same process—of advancing the micrometer one division at a time—no effect was produced until the

last millionth of an inch of distance was traversed, and absolute contact occurred with the end of the bar, when the deflection of the needle of the galvanometer instantly betrayed the movement. Repeated experiments showed this to be unerring in the result; and on placing the finger on the middle of the bar, under the same circumstances as before mentioned, the expansion was instantly detected by the deflection of the galvanometric bar.

By the application of this instrument, standard gauges for axles, taps, and other parts of machinery which it is desirable to maintain uniform, are constructed, and have been adopted in large manufactories.

One of the large lathe machines is capable of turning shafts thirty-six feet long. The peculiarity of this machine is the combination of two cutting-tools, at the opposite sides of the shaft to be turned, which bear against each other, and are governed by a common motion. Another pair of similar cutting tools is also placed on the bed of the same lathe. When a long shaft is to be turned, these four tools are brought to its middle point, and commence from that point cutting in opposite directions towards the extremities of the shaft. The advantage of the tools bearing on opposite sides is that all flexure of the bar which may proceed from the pressure of the tool is prevented by their mutual reaction.

There is also another lathe of great magnitude, constructed on the same principle, for turning and boring the wheels of railway engines and carriages. The wheels, fixed upon their axles, are suspended between the two-faced plates of the lathe, and two pairs of cutting-tools are applied to opposite sides of them, in the same manner as has already been described.

Civil Engineering, Architecture, and Building Contrivances.

The subdivision included the machines and implements used in hydraulic works, scaffoldings, and centring; machines used in the construction of bridges and tunnels, and expedients for crossing rivers and ravines; docks, harbors, and canal works; light houses and beacons; gas works and contrivances, for the production and distribution of artificial light; of roofs covering large areas of water works, and methods for the supply of towns with water; of sewerage, cleansing, paving, and the contrivances connected with the sanitary condition of towns; and also for the heating and ventilation of buildings.

It comprises some of the most important and interesting monuments of art; among which were found pile machinery, coffer dams, machinery for the construction of light-houses, diving-bells, and diving apparatus, boring apparatus, bridges of every form and material, canal machinery, harbors of refuge, breakwaters, jettings, wharves and piers, dredging machines, and machines used in harbor works, railway stations, and theatres, fire proof buildings, &c.

Model of the wrought iron bar Chain Suspension Bridge at Kieff, (Russia,) now erecting across the Dnieper; the largest work of the kind hitherto executed.—Designed by C. Agnoles, 'Trafalgar Square, London.

This bridge has four principal openings of 440 feet each, and two side openings of 225 feet. On the right bank of the river is a swivel

bridge, which gives a free opening of 50 feet for the passage of boats, &c., on the river. There is a disadvantage in the suspension principle when the chains cannot be moved from shore to shore, as in this case, an island of masonry having to be formed in the river as a mooring abutment, to allow of the free passage for boats at the other side. There are, therefore, three abutments, two for the chains and one for the swivel bridge, and five piers; all these required coffer-dams of unusual size, particularly for the abutments. The chains are composed of broad, flat links, twelve feet long, and weighing about four hundred weight each.

The tie rods which hang from the chains on each side are two inches in diameter, and are immediately connected to the girders which support the platform. The manner in which the platform is constructed is the chief novelty which has been introduced in their structure, and consists in a judicious combination of iron and wood, the object being to obtain a light and stiff platform. Two kinds of girders are adopted here, namely: trussed girders and tension girders; the trussed girders are chiefly composed of wood, and are deeper than the tension girders, which latter are rendered rigid by tension bars. One set of chains supports the trussed girders, and the other set supports the tension girders; and these occur alternately. The additional depth of the trussed girders is for the double purpose of stiffening the platform and supporting the foot-paths which are outside of the chains. The trussed girders are connected underneath, at each end, by longitudinal ties which run the whole length, and the balustrades separate the carriage-way from the foot-paths; they act conjointly with the ties underneath in checking any tendencies to undulation, the girders being also braced diagonally to prevent side play.

The whole of the machinery and iron used in the construction of the Kieff bridge was made in England, and weighs about 3,300 tons. Nine steam engines are employed, varying from eight to fifty-horse power, in pumping, driving piles, grinding mortar, and hoisting timber, &c. The cost of the bridge, when finished, is estimated at £400,000.

Model of Railway Bridge over the Wye, at Chepstow.—By Brunel.

This bridge is a novelty in engineering. It is composed entirely of wrought iron. One span is 300 feet, and the other 100 feet. The principle of construction adopted in spanning the 300 feet seems to be that of an extravagant trellis; and another principle of the same character as the Britannia tubes—that is, the top is subject to compression, and the bottom to extension. This bridge has two lines for the up and down trains.

The span of 300 feet which we allude to more particularly consists of two huge, uncouth-looking trussed girders; the bottom of each girder is composed of two simple wrought-iron beams, which resist extension, and between which one of the lines runs; these beams are formed of boiler plates riveted together. The two girders are supported at two points, 100 feet apart from each end, from a wrought-iron tube above, which stretches across the whole span; and this tube resists the compression. This tube has also been raised at a considerable elevation above the bottom girders, so that the weights—such as trains, &c.—passing along the line, may be properly resolved or distributed over the tube by means of the tie rods and stays. The 100-foot spans are crossed simply by wrought-iron beams.

Model of One Arch of the High Level Bridge at Newcastle-upon-Tyne.—Exhibited by Rasks, Crawshaw, & Co., of Gateshead, contractors for the Iron Works.

This bridge was designed by R. Stephenson, and is certainly a masterpiece of engineering. The banks of the Tyne, both at Newcastle and Gateshead, are exceedingly steep, and are connected by a viaduct 1,375 feet in length, running at a height of 112 feet above high-water mark. There are six principal openings, each of 126 feet span. The principle on which the bridge is constructed is the bow and string; the arches which form the bow are of cast iron, and the rods which form the strings are of wrought iron, to resist tension. There are four arches to each span, two on each side, which bear properly on the piers, through the medium of bed plates, on which the arches rest; the strings of each arch consist of two wrought-iron rods, keyed to the arches at the abutments. Cast-iron columns, connected to the arches, support a platform above, on which three sets of rails are laid, and they also support another platform below for a carriage road, the footpaths running between the two arches on each side. This road, in fact, runs along the strings, but has no connexion with them. The arches take the weight of both platforms above and below, having the strings independent, to resist only the tension. One cannot examine this bridge without having the mind strongly impressed with the rapid progress made in the mechanical art, a structure of this kind, particularly the iron work, requiring the adjustment of an immense number of parts; and yet no joints, and hardly any fastenings are to be seen—in fact, it is difficult to make out how it has been put together. The piers may look light to the eye for the superincumbent mass, but actually it is another striking feature in the structure, and speaks in favor of the progress in another branch of engineering known as civil.

Model of the Central Arch of the Anse Burn Viaduct on the Newcastle and North Shields Railway.—B. Green, Newcastle.

The great peculiarity of this bridge consists in the light and economical method of construction. The arches are of timber, built up of layers or planks sufficiently thin to allow being bent to the required sweep. The arch having thus been built up to the required size, is bound together by iron straps, bolts, &c. It is then scientifically strutted to resist and distribute whatever may be required.

Model of an Improved Lantern and Revolving Apparatus for Light and Signal Vessels at Sea.—W. Wilkins & Co., Long-acre.

The principal improvements in this apparatus consist in constructing the machinery to work beneath the deck, instead of in the lantern, as formerly. A vertical rod, working in metal bearings, is attached to the mast, with a large gun-metal pinion fixed to the top of the rod at the height to which it is necessary to hoist the lantern, wherein a train of cog wheels is placed, to connect with the pinion and communicate the motion obtained therefrom to the traversing apparatus that supports the lamps and reflections.

The advantages of this arrangement are, that the lanterns can be made much lighter; that the rolling of the vessel, caused by so great a weight at the mast-head, is greatly diminished; and the machinery, being more under control, and better protected, works with greater regularity and precision. In the opinion of experienced persons, these improvements are most important, and the uninitiated may form an idea of their utility by reflecting upon the situations in which the light vessels are placed; and also that these vessels are at all times difficult of access, and in stormy weather, when accidents are most likely to occur, quite unapproachable; so that it will be obvious any alteration which reduces the liability to derangement is greatly to be appreciated.

There is also a vast benefit derived from the novel construction of the lamps and jumble work, which, by a movement exactly coinciding with the motion of the vessel, causes a perfect level to be always maintained, and insures the proper flow of oil to burners, however irregular that motion may be. This improvement is not of so recent introduction as the former; but when it was first invented, it produced a complete revolution in the apparatus used for floating lights, and enabled the beautiful argand lamp, with parabolic reflectors, to be used instead of the old lamps with flat wicks.

There are 108 light-houses on the English coast, 51 of which are for ports or harbors.

There are also 18 floating-lights; including Scotland and Ireland, there are 219 light-houses, most of which are under the control of the Trinity House.

They collect £240,000, and cost £97,000.

Model of Liverpool Docks.

This model is undoubtedly one of the most interesting objects of the kind in the Exhibition. It originated in a desire, on the part of some of the leading inhabitants of Liverpool, that this great port, the outlet of so large a portion of the commerce of Great Britain, should be fairly represented in the display of all nations. The idea has been admirably carried out by Mr. J. Grantham. The model is 40 feet in length, 10 feet wide, and on the scale of eight feet to a mile, and represents a surface of five miles. The docks are represented as being filled with 1,600 small vessels, fully rigged; and, altogether, the model forms a very beautiful object, impressing the inspector with the magnitude of Liverpool as a port.

The model is chiefly cut out of wood, the finer portions being constructed of paper, and the water represented by glass, stained of a greenish tint, and silvered, in order to reflect the ships which float on its surface. Its cost is stated to be £750. It is supported on an appropriately designed base, formed of elephants, cast in iron, from the back of which the columns which support the roof arise; pediments filled with appropriate decorations, in imitation of bas-relief, being at the end and centre. This model is strikingly calculated to display the advantage of this most important commercial town, of which some idea may be formed from the following statistics: In the year 1650, it is said, there were only three ships belonging to the port. In 1816 there were 6,888 entered the docks, of 774,243 tons burden, and paying, in dock dues, £92,500. In

1850 there were 20,457 vessels entered, of 3,500,000 tons burden, and paying £211,000 dock dues. There are 21 docks, 2 half-tide docks, 8 graving docks, and 4 basins, capable of containing 1,500 sail. The annual income of the docks is about £300,000, and the charge about £280,000. The receipts of custom duties, in 1850, amounted to £3,366,284. Liverpool imports eight-ninths of all cotton shipped to Great Britain. As many as 50,000 hogsheads of sugar, 20,000 barrels and bags of coffee, and 10,000 puncheons of rum, have been brought to Liverpool in one year. As one among numberless illustrations which might be given of the extent of Liverpool commerce, it has been stated that 27,000 cubic feet of logs of cedar, for making lead-pencils, have been in the docks at one time.

Out of the remaining numerous objects well worthy of careful inspection, we can only briefly enumerate a few of the most striking. The model of a self-supporting suspension bridge, invented by Captain Kenezynski, presented the means of building a wooden bridge without any support from centring. If it be a bridge of one arch, for example, short iron chains, or bars of iron, are fixed in the mattresses on each side, to be used as supports for the first timbers of the arch. As the work proceeds, other and larger bars are attached, to act as a scaffold for the next timbers; and in this manner the work is advanced from each side until the key-block of wood can be inserted, and the arch can support itself. The suspension bars are retained as additional supports, and, by means of screws and nuts, may be lengthened or shortened, to increase or diminish the strain upon them.

The model of a bridge of a very new kind is exhibited by Mr. Bain, of Greenwich. It is intended to cross a river, without offering hindrance to ships of any size. The road-way is enclosed in a large tube, to be let down under the bed of the river, like an inserted arch. This tubular bridge under water is to be lighted by apertures in the upper portion until the water-mark is reached, and if the curve be not very great, the light admitted on both sides might penetrate sufficiently to the bottom.

Another curiosity in the plans proposed for crossing rivers was exhibited in a rough model of a portable bridge across the river Avon, at Clifton. The suspension bridge from cliff to cliff having been abandoned, for want of funds, it is proposed to have a platform elevated from a truck, moving on rails, in the bed of the river.

A model of the landing machine for the floating railway ferry to the Edinburgh and Dundee railway exhibited the curious contrivance adopted for shipping and unshipping railway carriages. The steam ferry boat has rails fore and aft, on which the van containing the luggage and heavy goods is shipped, to be carried across the Frith of Forth. The landing machine, in appearance, resembles a draw-bridge; one end of it is lowered into the fore-part of the ferry-boat, and fixed to it so that the nails on both may coincide. The carriages are then allowed to run down singly into the boat, their speed being retarded by means of a rope. In unshipping the train, the rope is used to drag the carriage up the incline, which, at low tide, is very steep.

The commissioners of northern light-houses exhibited a model of the Skerryvore light-house, which has been built in recent years, under circumstances of immense difficulty. Mr. Allan Stephenson undertook the

work in 1834, but it was not until ten years afterwards that the lights were exhibited. The rock is twelve miles from a small island called Tinee, and Tinee is two or three days' sail from any part of the coast whence supplies could be obtained; hence the difficulties encountered by the engineers and workmen were most harassing. It was at all times difficult to approach the rock, and when there, the number of working days in a year was very small. The rock itself is excessively hard, and the difficulty great of transporting stones thither. But all difficulties gradually gave way to the skill and perseverance of the engineer, and the structure was at length completed. It is 138 feet high, curving inwards from a basis of 42 feet. It contains nine stories, or apartments, in height. More than 4,000 tons of materials were used in its construction. The lighting apparatus consists of eight annular lenses, revolving round a lamp of four centric wicks, and producing every minute a bright blaze, visible at a distance of 18 miles.

There were some models of gas apparatus and gas metres; but the exhibition of gas apparatus was very limited, on account of all fire and light being prohibited in the building. This very necessary regulation had the effect of inducing most of the manufacturers of gas burners, and other gas apparatus, to decline exhibiting.

Near to the gas apparatus was a ventilating pump, worked by a weight, and producing a copious stream of air, at a moderate velocity, suitable for the ventilation of private houses.

One of the most unique models of its kind, and which was an object of deserved admiration, was that of the Under-cliff, Isle of Wight, by Captain Ibbetson. It is the only model of a large extent of country on an equal scale, the vertical height and base being on the same scale; and it is also probably the only model that has been entirely worked out of doors. We understand that it was carried into every corner of a field or court, and modelled on the spot, and that there has been more than 60,000 heights measured trigonometrically, and all correspond with the base. The geological strata on the cliffs have also been measured trigonometrically. The entire labor occupied upwards of five years, and altogether reflects the very highest credit upon the ingenuity and perseverance of Mr. Ibbetson.

*Naval Architecture, Military Engineering, Ordnance, Armor, and
Accoutrements.*

In this class were included models of ship-building, for the purposes of commerce and war, for the application of steam and other powers, and also of vessels used for amusement, and small vessels generally; rigging, anchors, windlasses, and articles connected with practical seamanship, and the saving of life from shipwrecks; infantry and cavalry arms, clothing and accoutrements, camp equipages, naval gunnery, and weapons of attack and defence; artillery equipments both in garrison and in the field; machines for mounting and dismounting ordnance carriages, &c.; ordnance and projectiles, small arms—such as rifles, muskets, carbines, pistols, &c.; and, lastly, military engineering, field equipments, methods of passing rivers and other obstacles; the attack and defence of fortresses, and field fortifications.

The models of vessels were exceedingly numerous, and were most of them remarkable for their delicacy and finish. A steamer exhibited by J. Clarke, of Birkenhead, was amongst the most attractive objects in this class. The whole was remarkably well proportioned, and was fitted up in the most complete manner, exhibiting all the latest improvements introduced in steamers of the larger class. This model merited the attention of those acquainted with naval architecture, as it was rigged in the most perfect manner, both as regards the materials and style. The hull, which is also very neatly finished, is also of a good mould, and suitable for speed and stowage. This vessel seems well calculated to possess all the qualities desirable in a good sea-boat, and for carrying weight at an increased speed.

Model of Life-Boat.—By Mr. Dyne, London.

The object of this invention is to render ordinary ships' boats so buoyant that they virtually become life boats, and are capable of saving the crew and passengers under almost any circumstances. The material employed is naturally extremely buoyant, and by the process to which it is subjected is rendered impermeable to moisture. By filling the spaces between the timbers and beneath the thwarts with this material, previously made up into properly proportioned packages, and then covering the whole with a thin lining of board, a boat is rendered so buoyant that, even when overloaded with passengers, should the waves break over it, there would be no risk of its sinking; or should even the bottom be stove in, the frame would float and act as a raft, which the material, from its tenacity and fibrous nature, would hold together. The specific gravity of the material is so very small that the additional weight to the boats is scarcely felt on hoisting them on board, and no injury can be caused by driving nails, or by blows, as is the case with metallic or cloth air-tubes, &c. The process can also be advantageously applied to the bulwarks, and between the timbers and ceilings of ships; and it must be evident that in the event of their going to pieces, each portion would, from its power of flotation, become a life-buoy. It should be remarked that the material can be adapted in any bulk, in any form, and to any part of the ship or boat usually left vacant; and, consequently, that it will not diminish the space for stowing the cargo, and that the mattresses, couches, seats, and all the furniture, could be rendered subservient to saving life. It may likewise be applied to jackets, belts, life-buoys of all kinds, and floats for fishermen. The life belts are unequalled in lightness, can be adjusted in ten seconds, and are incapable of being injured by puncture or climate.

Mr. W. Dyne, of London, exhibited a life-boat formed of diagonal battens, laid similar to that of lattice-work—its outer sheathing being formed of gutta-percha; its buoyancy is 350 cubic feet of air, capable of sustaining upwards of nine and a half tons. It has in its bottom 3,600 holes, half an inch in diameter, to allow all water supplied to pass off. It has a convex bottom, thirty feet long, two feet wide, and eighteen inches deep, in which are placed three perforated fins for the purpose of steadying and keeping the boat in an upright position, acting, when the boat lurches from either beam, similar to a paddle-wheel, a reaction taking place, through the perforated parts, which will be seen to multi-

ply its weight of water to four times its amount. In this convexed part, and between the fins, are contained two tons weight of water which must be displaced therefrom before the boat can turn over; but such will be almost impossible, it being more than half the weight of the boat. As a provision against such a disaster, she turns over on her quarter sixteen hundred weight of water, which rights her again. It may be remarked that the two tons and sixteen hundred weight of water referred to are not one ounce weight to the boat when in her upright position. At the stem and stern, and on each beam and quarter, is run a bow, to which are connected galvanized springs, which will not corrode, and which will be found of the greatest utility in the event of collision—which act similar to railway buffers, and enable a stranded vessel to communicate with the shore. It is intended to be placed at the stern of the ship, so that on any alarm being given of “a man overboard,” the person at the helm can dislodge it instantly, and, as it falls into the sea, a fusee becomes ignited, which burns with a brilliant light, guiding the sinking man to it. Should the accident occur at night, four uprights are placed upon it, containing rockets, blue and other lights, to be kept burning and shot off.

The same person also exhibited an emigration life boat, intended for a first-class vessel, of the following dimensions: 20 feet long, by 14 feet wide; it is united by strong bolts, and is very portable from the mode of its construction, which allows it to be folded into the compass of 20 feet long, by two feet six inches wide. On occasion of shipwreck, it is capable of supporting 100 persons, with provisions, for seven days; in addition to which, it may be made available for a portion of the cargo, and can be put in requisition in a few minutes.

The Duke of Northumberland had recently offered a prize of £100 for the invention of the most efficient form of life-boat, and this offer led to the exercise of much ingenuity on the subject. No less than 54 models competing for the prize were exhibited, of which we can only notice two or three.

The first thing to be provided against in a life-boat is its liability to capsize in a heavy sea. One mode of remedying this evil is so to construct the boat that it may right itself immediately after being upset. To effect this, it is necessary that the boat should be of a very peculiar shape, which may probably not adapt it so well for going through the water, and that it should be heavily weighted along the keel, giving it a deep draught of water, which renders it difficult to pull, and to get rid of the water when swamped, as a boat so deep in the water is peculiarly liable to be.

In most of the models exhibited, the total width is eleven feet; and we imagine it will be exceedingly difficult to launch them in a strong breeze, when blowing into the coast from which they are to set out. Moreover, these boats are liable to turn over, though they will right again. Prevention is better than cure; and it is, therefore, manifest that a boat which cannot upset is better than one that will upset and right itself, half-drowning and knocking about the persons on board, and washing away those who are unfortunately not lashed. If, in order to prevent upsetting, the breadth of beam be greatly increased, it offers too much resistance to wind and water, especially on moving against a gale. A double-bodied boat, consisting of two boats held apart by a

platform, or by several beams, would be far more difficult to upset, while it would be more manageable, and offer less resistance, both to wind and water.

The model by Mr. H. Severn, one of the competitors, was constructed after this fashion, and was not only remarkably ingenious, but very handsomely finished. His boat was sixteen inches wide, and seemed to possess more beam than any other model in the collection, and appeared at the same time well calculated to row as fast against wind or sea as a boat eight feet wide; each half boat being four feet wide, and eight feet apart, which gives it sixteen feet beam; it also requires no ballast, frees itself of water, and would sail fourteen miles, or more, an hour. The principal advantage of this boat appears to be, that if a person were in the water, the boat rowing up, he would come between the two, where he could be caught by the crew, in either boat. The greatest difficulty in boats of this kind appeared to be the manner of fastening the beams; but this Mr. Severn has successfully overcome by three beams, which are fastened by bands of copper going round the bottom under the keel, up the first side, and united on the top of the beam also by a diagonal rod.

The model by W. Teasdel, like many others, was very good, but had only one head, which, when a gale is blowing, and a heavy surf running, is very dangerous on account of turning round. There were many others among the competing models, which were on the old principle.

There was another life boat deserving of notice, and remarkably beautiful in form, clinker-built, with flanks of gutta-percha, exhibited by W. Bonny.

The sides were doubled from the bilge to the spar-deck, and divided into water-tight compartments, and the fore and aft parts of the boat were also divided in the same manner. She had been rowed and sailed on the Thames, and many experiments had been made with her. She was repeatedly filled with water; men endeavored in vain to overturn her, and she sailed full of water, apparently without the least impediment; though ordinary boats, under such circumstances, would have been wholly unmanageable and useless. The yacht, being hauled over, and so half filled with water, upon being released, righted at once of herself. The inventor asserts that she cannot be capsized or sunk by accident, and hardly intentionally by powerful force applied to her. The plan is applicable to crafts of all sizes, and of any external lines, so that boats already in use can have the principles of the yacht applied to them.

There was a singular model, by a Mr. Bateman, for the construction of a wooden boat, having as many vertical cylinders as there are persons to be accommodated, each cylinder to be 36 inches deep, by 16 inches in diameter. Each cylinder has a cover when not in use; but when the cover is removed, a man may get into the cylinder, and thus seek for safety. The interstices are filled up with cork, and other arrangements made for lightening, strengthening, and rowing the boat.

There were several new methods of propelling and navigating vessels, among which we may notice the illustrations exhibited by Mr. J. Reed, Lieutenant Jones, and Mr. M. Ruthven. In Mr. Reed's invention he places two shafts perpendicularly with the stern post, and reaching to the bottom of the keel, when they are fixed one on each side of the

same, and at the bottom of each are attached square blades, or fans, which are made in such a manner as to feather in the direction required. The upper parts of the shafts are cranks, which are in the body of the boat; motion is given to these cranks by steam; they work alternately, and would, it is thought, supersede the screw for speed. The reversing gear is well managed; but would appear to require some further improvement, owing to a tendency to get out of order.

Lieutenant Jones exhibited a propeller of quite an original description, which is placed in the centre of the vessel; the propellers, three in number, are made in the shape of spades, the handles being fixed to cranks, of which there are six, three in the upper shaft, or beam, and the same on the other, to the upper, only placed some few feet below it; the shafts, or beams, are fixed in the same manner as in the paddle-wheel; motion given to the cranks, and the propellers follow each other, going at the same speed as the cranks.

In Mr. Ruthven's model, when the deck is removed, there are seen apertures covered by a kind of flooring, which forms a case for the water which the apertures let in; this conducts the water to a well in the centre of the boat, in which works a wheel similar to a paddle wheel, only placed horizontally. To each side of the well is attached a pipe, extending to the side of the vessel, where it is connected with a movable nozzle. The engine power is applied to the axis of the wheel in the well, which, turning round, discharges the water through the nozzles, and propels the boat. If required to go astern, the mouth of the nozzle is turned towards the bow of the boat; if to stop, it is placed perpendicularly downwards, and consequently will not exert any force either way. The faster the vessel goes, the more water comes in through the nozzles.

Of pleasure boats there was a large show, but not a very great variety. Mr. W. Biffen, of London, displayed a model boat, calculated to change into a four or eight-oars, at pleasure, by merely taking out some of the parts, thereby making one boat as good as two. When not in use, it can be packed so as to occupy less space than a single boat on the old principle.

A model of an outriggered sculling boat, sent by Noulton & Wyld, is very extraordinary, as the body of the vessel is composed of one single plank from stem to stern, without a joint or reel.

The Typhoductor, or Storm Pointer.

Colonel Lloyd, one of the special commissioners of the Exhibition, exhibited a very remarkable instrument, called a typhoductor, or storm-pointer—an instrument for obtaining by inspection the bearing and relative position of a revolving storm or hurricane. It is now a well ascertained fact, that great storms have a rotary motion, like a whirlwind. The theory commonly called the "law of storms," as made known in several publications by persons of eminence, has been established from thousands of well authenticated observations in different parts of the world, and extending over a period of several years. It proves that during a gale of wind, particularly near to the tropics, the wind blows with the greatest fury round a common centre; at this centre there is little or no wind, even a perfect calm; but there is generally a terrific and confused sea. The most violent and dangerous parts of these revolving gales are

somewhere near this central calm, the wind there blowing the most fiercely, acquiring, it is stated, a velocity of even a hundred miles an hour. These storms sweep both land and sea in certain parts of the globe; their track and direction are pretty well known, and they travel bodily from their place of origin to their destination at variable speeds—sometimes at not more than four to six miles per hour; sometimes, but seldom, at that of 20 to 30 miles per hour, although the wind within their range is blowing round with the fury just mentioned.

If a ship unhappily becomes entangled within the range of these terrible gales, she is in great peril. Many have foundered, and others have pursued their fearful course round and round until they have been reduced to helpless wrecks, dismasted and water-logged. In the northern hemisphere these winds blow round the compass from east, by north to west, or the contrary way to the hands of a watch; whereas in a southern hemisphere it is just the reverse, blowing round as the hands of a watch would go.

This principle must always be borne in mind as the very foundation of all the information to be sought hereafter. On these most valuable data, instructions have been drawn up by Colonel Reed, and others, how to ascertain the relative position of a gale, so as to know whether it is approaching to or going from a ship, travelling by its side, or crossing its path.

The object of Colonel Lloyd's ingenious instrument is, by graphic illustration, to show that when the wind blows from a particular point of the compass, you can only be in one relative position in regard to the centre of the whirl storm, so that either the storm is approaching the ship or the ship approaching the storm, and first, of course, encountering the outer edge. As a consequence of the law of rotation, the wind, supposing the whirl to be circular, must blow at a tangent, or right angles to the point of the compass where the ship or observer may be, but under diametrically opposite conditions, as far as regards the two hemispheres. Thus, in a northern hemisphere, if the wind blows east, the centre of the storm must be due south of the observer; blowing north, the vortex east; coming from the west, the centre of the gale is north; and, lastly, with the wind south, the gale is due west. Of course, in the intermediate points of the compass, the bearings are likewise different.

In a southern latitude the whirl-storm blows round just the contrary way. With an east wind the storm centre bears north; with a north wind, west; with a west wind, south; and with a south wind, east. Bearing in mind these facts, and with sea-room, it is easy not only to avoid hurricanes, but to make them subservient, in many cases, to the ship's ultimate course.

There was a formidable display of guns and weapons of every description in this section. In the English department some small models of artillery, amongst which those of Captain Tylden, were remarkable for their work and finish. Of the system of loading large guns at the breech, there is but one specimen, by Mr. Gardner, of Lambeth. Although this system is of the greatest antiquity, the amount of initial velocity lost by an imperfect closing of the breech caused it to be discontinued; but the introduction lately of long ranges, and an increased accuracy of fire from greater perfection in the guns, have again led attention to be directed to the subject. The advantage possessed by this

system is that its manner of loading, and small recoil, allow of casemates being of less depth, thereby saving expense of construction. About the year 1832 a small gun, having a leaden bullet of 107 grains, was tried at Turin. In this model the bore was pierced right through the piece, and the breech was crossed horizontally by a quadrilateral hole, where a coil was placed, to block up the bottom of the bore after the piece was loaded. This has been the basis of all subsequent inventions. The first experiment on a large scale was tried in Savoy on a six-pounder, which, after a few improvements, succeeded so well that a similar one was cast at the Acker foundry, in Sweden, by the Baron Wahrendorff. The Swedish government afterwards cast twenty-four-pounders for this purpose; and in 1842 they were tried at Woolwich. The object intended was to show how by this system, being applied to guns on board ship, the accidents which sometimes occur from the difficulties of running guns out and in would be obviated. Although the experiments proved successful, yet the still complicated manner of closing the breech would not allow of its being brought into general use. M. Gardner's model, although ingenious, by no means lessens this objection; the mass of mechanical force employed for this purpose being excessively cumbersome, and the length of the lever which he employed, if on the scale of a twenty-four-pounder, would be perplexing.

The improved gun-carriage, exhibited by Messrs. Ferguson, is well worthy of attention. It consists of a most ingenious application of the slide to common broadside carriages, including friction chocks, training chocks, and trucks of an improved form. These important improvements can be fitted to the broadside carriages now in use without occupying any more room on deck; nor would their application alter the general appearance or system of exercising the guns; while a saving of expense would be effected, both in time and labor, as compared with the working of ordinary carriages. The friction chocks act as a powerful check to the recoil, and also prevent the guns running out otherwise than required; these movements being under perfect control by one man, and capable of being regulated with the utmost nicety. Guns fitted with the improved carriage may be secured at sea by any of the usual methods, in addition to which they will have the powerful aid of the friction chocks to keep them in their places. In case of injury, all the parts are easily repaired; and should it be necessary to transport the guns on shore, or on board other vessels, the added improvements will in no way impede their usefulness as common carriages, and the additions may be removed in a few minutes, if required.

The howitzers and mortars of wrought iron, from Spain, indicated a certain class of artillerists who desire to introduce wrought-iron into the service for field guns. There are two qualities necessary for the soundness of every gun, which are tenacity and hardness of the metal; and the superiority of one piece over another (all their points being similar) is calculated by the quantity it bears to the other relative to these two propensities. A certain weight is also requisite to prevent too much recoil. Every species of wrought-iron presents a fibrous structure—the fibrous being more or less distinct and apparent according to the process made use of in the work. In iron beaten with the hammer, the grain or the fibres are not so easily discerned, and the bars have a more uni-

form tenacity in the several directions. By comparing with one another the several processes by which iron is wrought, we come to this conclusion: that the fibres always form in the direction in which the iron lengthens. All that has been said with respect to iron is generally applicable to steel, except that the force or cohesion of steel far surpasses that of iron-bronze; and iron castings, on the contrary, present a uniform force of cohesion in every direction—their structure consisting in an admission of crystallized grains, of which the crystals are often apparent to the naked eye. Although these wrought-iron guns present apparent advantages—amongst others, of having the direction of the fibre of the iron perpendicular to the axis of the gun, where the greatest strain from the power is exercised—yet their objections in real service are so great that their practicability cannot be admitted. It is difficult to bore them so accurately that no fissure should be made in the metal, which, on ramming down the powder, might cause ignition. They soon destroy the carriage by the suddenness and length of the recoil.

The oxidation of the bore will so enlarge it as to render it unserviceable; and not the least of these objections is the moral effect on the men from the fear of their bursting. If wrought-iron is objectionable in field guns, it is more so in those of large calibre. An almost insurmountable difficulty exists in welding the parts together perfectly, and an impossibility of ascertaining whether the welds are perfect; for when the boxes are of small size, as in gun-barrels, the hammering compresses and reunites the particles, and corrects these defects; but in large masses the effects of the hammer do not reach the interior of the mass, which is consequently left open and spongy, although the metal on the surface, and to a slight depth, is compact and fibrous.

The shot and shells of cast steel from the Russian imperial works were fine-looking specimens of their projectiles. The hardness of their surface will be valuable in the field, by causing more dependence to be placed on the accuracy of windage.

From the United States three different kinds of articles in gunnery only were exhibited. These were the common army rifle, Colt's revolvers, and Maynard's primer. The first of these, manufactured by Robbins & Lawrence, of Windsor, Vermont, received much approbation for the excellent quality of their material, and the thoroughness and completeness of their workmanship. The second article mentioned, Colt's revolver, probably gained a firmer hold in the estimation of the best judges of fire-arms than any piece of gunnery which has been invented the last fifty years. Though it had been long in use with us, both for army and sporting purposes, it seems not to have been known in England. Meeting with doubts upon its first presentation at the Exhibition, it gradually gained its way into favor, until, before the close of the Crystal Palace, it was universally acknowledged to have achieved a success unequalled by a single invention from any part of the world.

Hardly second to the revolver in the impression made upon the public mind was Maynard's primer. This most ingenious and effective piece of mechanism, the very simplicity of which is its greatest wonder, when applied to fire-arms of any model, increases their efficiency to a degree which, to be fully realized, must be personally witnessed. Too late in its arrival at the Exhibition to be passed upon by the jury of awards, it received, nevertheless, from scientific men, army officers, and professed

sportsmen, a meed of approbation that far exceeded any renown it could have acquired from the "medal" or "mention" of excellence.

The detonating material of Maynard's primer is in the form of *little lozenges*, each about one-sixth of an inch wide and one-thirtieth of an inch thick. These lozenges are enclosed between two narrow strips of strong paper, cemented together and rendered water-proof and incombustible. The single strip thus made is a little less than one-fourth of an inch wide, and contains four of these lozenges (each of which is a charge) in every inch of its length; the charges forming projections of their own shape on one side, leaving considerable and equal spaces between them; the other side of the strip being one flat surface.

One of these strips, containing fifty (or more or less) charges, is coiled up and placed in a magazine in the lock, where, by opening a lid, it can be inspected readily, and from whence it is fed out by the action of the lock, one charge being moved forward each time the hammer is raised. When the hammer descends it cuts off and fires the charge fed out upon the nut (or nipple, if one be used) of the gun, thus igniting the powder of the cartridge in the barrel.

These primers are made by a very simple machine, (also invented by Dr. Maynard,) capable of making a million a day, at about one-tenth the cost of the percussion caps heretofore used in the United States army and navy.

CONCLUSION.

A comprehensive view of the vast collection of objects in the great Exhibition is the great desideratum with all those persons who have read only of its marvels. Such a view it is not easy to give. Every report which has ever issued from that great storehouse of industry, whether from the royal commissioners, the foreign commissioners, the juries, or the executive committee, has dealt of details. It has almost necessarily done so, because through details alone could the mind create any picture of the vast edifice, and its contents, which should at all resemble the original. And yet a comprehensive view of the whole—so that, when the disposition and arrangement of the building have been mastered, a just conception may be formed of the whole display, the characteristic features of each part be distinguished, and definite ideas of the industrial attributes developed be stored in the mind—is what is most needed.

The industries of nearly all the nations of the globe were presented in Hyde Park. In those industries the national individuality was preserved. They became the most faithful mirror, in fact, of national character which could be exhibited. Other pictures may deceive, but the picture which the industrial products of a people present must be true. The course of events, guided as it is by a higher power than man's, does not always illustrate the moral and social attributes of communities. Not so the fruits of labor—the quality and description of material which engross the toil, supply the demand, and engage the tastes and predilections of a people. These tell their tale as faithfully as the actions of an individual indicate his nature, and by them, rightly considered, the condition and progress of a community may be correctly judged.

The form of the Crystal Palace has been made familiar, by innumerable pictures, to the whole world. In some respects it resembled a cathe-

dral, its long avenues, stretching from east to west, being intersected midway by a transept. An equal division of space thus resulted, which was turned to account in the most appropriate manner. The western half was occupied by the industrial products of the British empire; the eastern by those from other countries. The question of precedence, not as between Great Britain and the world, but between all foreign rivals, was settled by a geographical solution. The transept was the equator. India, on the British side; China, Tunis, the Brazils, Persia, Arabia, Turkey, and Egypt, on the foreign side, were grouped around it as the torrid zone.

This geographical plan was not, and indeed could not be carried out through the whole building; but it extended far enough to destroy all ideas of preference as to locality, and all feelings of jealousy arising therefrom. It harmonized, also, admirably with the character of the structure, and gave a symmetry and equipoise to the whole which would not otherwise have been attained.

As Great Britain occupied the greatest space—a space equal to all the rest of the world—she certainly deserves the first notice. Crossing the transept, the first compartments westward were occupied by the products of the British colonies. India—with its pottery, its inlaid ivory, its renowned textile fabric, its jewels and gold, surpassing the most finished productions of any European nation—contrasted strangely with India as the contributor of the rudest furniture, the most awkward machinery, the most uncouth household implements, and the most fitless mechanical tools of any country on the globe. And yet nothing could more correctly represent India as she is—uniting the highest skill with the most brutal ignorance, princely wealth with abject poverty, and luxury beyond description with want that seeks no higher end than the sustenance of a day. The Australian possessions, the Canadas, Nova Scotia, New Zealand, the British West Indies, the Cape of Good Hope, Malta, western Africa, the Channel islands, and all other parts of the world where the cross of St. George has been planted, were each represented by itself in its own peculiar products. In some were seen the evidences of barbaric pomp, belonging to the traditions of the past; in others the rudeness in design and material of all the useful arts; in others yet the trophies of ancient civilization and refinement, marvelously brought down to our own time; the fruits of labor upon the virgin soils of Australia and the Canadas, sent to be consumed in the mother country; the mineral, vegetable, and animal treasures, sought out by commerce and made valuable by manufactures; and the raw produce in various conditions, indicative of the struggle of infant communities towards a larger industrial development.

The colonies of Great Britain occupied, nevertheless, but a fractional part of her immense space in the Crystal Palace. It was from the United Kingdom that the great mass of her productions came. The comparative ease, freedom from expense, and direct benefit to be gained, which the British contributors enjoyed, furnished one great reason for the full representation of the industrial products of the country. But, with all these advantages, no person could witness the extent, variety, and excellence of the proceeds of British labor with which nearly one-half of the immense fabric was crowded, and at the same time remember that each one of these myriads of articles was but a sample of vast pro-

ducts daily issuing from loom, and furnace, and workshop, to fill the markets of the whole world, without astonishment and admiration. Her raw produce, filling one immense compartment, half the length of the whole building; her mining, quarrying, metallurgic, and mineral products, occupying the extreme south; her chemical and pharmaceutical products and processes—substances used as food, and vegetable, and animal substances used in manufactures—stored in the galleries; her pleasure carriages and railway and naval mechanism, arranged along the north; her civil and military enginery, on the west; her agricultural implements, occupying an immense ground area parallel with her minerals; her philosophical, musical, surgical, and horological instruments, and the processes depending upon their use, handsomely arranged in the galleries near the nave; her display of manufacturing products, comprising nineteen sections, arranged on either side of the central avenue above and below—cotton woven fabrics, fabrics woven of mixed materials, leather, furniture, hardware, cutlery, furs, and paper, occupying principally positions on the ground floor; and silks, velvets, shawls, carpets, floor-cloths, clothing, jewelry, glass, ceramic manufactures, and earthenwares placed in the galleries of the nave; her fine arts, crowding the sculpture court, and scattered throughout the building; and her manufacturing machines and tools moved by steam, plying their multiplex labor in one immense and separate compartment—showed what must be that vast and complicated system which supplies the materials to feed her swarming millions, which maintains her commercial credit, and enables her to pay the interest of a debt which would overwhelm most nations of the world.

The genius of Great Britain is mechanism. More than in any country on the globe, mechanism is there extending its dominion over the whole empire of labor. In textile fabrics, in fashioning iron like wood to the most exact proportions, in working the printing press and navigating the ocean, in all agricultural pursuits everywhere, in everything lightening the burden of toil and rescuing human life from dangerous pursuits, mechanism reigns supreme. Beyond this the genius of Great Britain has not gone. Ornament in all her productions is inseparably wedded to usefulness. The creation of the beautiful with her artisans rests only in the adaptability of mechanism. It is said that a better and purer style of national industry is beginning to be observable in England; but however this may be, her best productions, when placed beside similar productions from the continent, show violation of harmony in color and design, and evidences of neglected taste, to the most casual observer. But in mechanism, in its highest and noblest ends, in its tendencies to relieve labor of its drudgery, and to delegate to iron, to steam, and to other powers of the inanimate world the burden of toil, Great Britain must be acknowledged to be in advance of all the world.

Crossing the transept, in the centre of which the crystal fountain glittered in light, China, Tunis, Egypt, and central and southern American tropical countries, first spread out before the spectator their various productions. The collection of Chinese manufactures bore that peculiar impress of which no article from the "flowery land" is ever divested. The porcelain from the great works of the Pozang Lake, the chemical preparations, recalling the historical fact of the early development of chemical knowledge among its inhabitants, the edible birds' nests, the

porcelain jars and vases, the lanterns, screens, and elaborate carvings, the lacquered and japan ware, and other articles long known to travellers, but which recent commercial intercourse has brought into the world, were all stamped with those features, which, like the physiognomy of its inhabitants, are recognised as soon as seen.

The peculiar industrial products of Persia were brought together in sufficient numbers to convey a somewhat adequate conception of the direction given to their activities. Particularly did the embroideries, rugs, and carpets give a true test of the prevalence of those principles of chromatic selection which influence the inhabitants of sunny climates. The character of these articles, too, like those from China, can never be mistaken; the ornament, with its tastefulness, ever displaying that peculiarity of arrangement and design which immediately leads to the recognition of its Eastern origin. Leaving these and all the miscellaneous objects connected with Eastern luxuries, passing by, also, however curious in themselves, as too small for notice in a mere general view, the feathered flowers of Brazilian industry, the vegetable wax and candles from St. Domingo, the mineral wealth of Chili, and the mats, head dresses, bark cloth, and Indian vases, presented by her Majesty, Pomare, Queen of the Society islands, let us stop for a moment before the large collection of Tunisian productions, sent by one exhibitor only, in the person of the Bey, his highness Mushir Basha.

The space allotted to Tunis was fitted up with counters and stalls, after the manner of a series of native shops. In the centre was pitched the hair tent of a Bedouin Arab. On the walls hung the gay caparison of his horse and the holiday attire of his wives. Heavy carpets covered the floor, and skins of the leopard and lion made the lounges and beds. Here were the leaves of the famed henna, the figs, raisins, and dates, the saffron and indigo, the cloaks and *joubas*, with their oriental characteristics, and the fez caps, with their brilliant dyes. This whole division formed a true and highly picturesque representation of the industrial condition of Tunis, itself a kind of trophy of ancient civilization, marvelously brought down to the present day.

The products of Egypt, presided over by Captain Abdel Hamia, himself the most curious production of all, presented, not an extensive, but a complete and interesting collection. The beautiful cottons, linens, and silks of the native looms, the Damascus swords, the dried and preserved fruits, the rice, wheat, Indian corn, barley, beans, and lentils of this wonderfully fertile country, and the rude domestic implements, in contrast with the beautiful specimens of embroidery and textile art, show the industrial condition of a people preserved through centuries without change or progress.

Of Greek exhibitors, inclusive of the Greek government, there were thirty-five in number. The articles they exhibited indicate the existence of various sources of wealth, which appear only to await a vigorous application of the means of industrial progress to become productive. The vegetable products shown included valonia, madder, currants, raisins, and tobacco; the mineral, those marbles which, wrought by ancient art, have formed the admiration of every time and people; and the animal, a jar of Hymettian honey, linked with classical associations. But the products of Greece at this day, like her people, bear the lineaments of degeneracy.

Perhaps no portion of the Exhibition attracted more general attention than that which was occupied by Turkey. To the more stupidly curious visitors, the luxurious furniture and gorgeous trappings which she displayed were objects of unceasing admiration; while to intelligent observers, the evidences which were to be seen, amid the barbaric splendor of her manufactures, of a genius struggling for freedom, enlisted a kind and degree of sympathy unlike what was manifested for any other nation. Too much praise cannot be accorded to the Sultan for his endeavors to revive the manufactures which once existed, and by the introduction, at his own cost, of new machinery, to give a fresh impetus to the industry of his country. The surest basis of her future progress, however, is to be found in the enlarged education she is giving to her young men. Her means of instruction at home are rivalling those which the best schools of Germany and England confer, and added to these she sends a large deputation from among the most promising sons of her chief citizens abroad every year; not to acquire the arts of ship-building and civil engineering alone, but to become conversant with the views of men of sound practical opinions on all important subjects. In embroidery and articles of gorgeous work, Turkey has long stood pre-eminent among oriental nations; but she seems to be aware that the day has arrived when a display of mere magnificence is no longer accounted the test of wealth or greatness. In proof of this, she produced at the Exhibition broad cloths, equal to the best English; cotton fabrics and silk piece goods, little inferior to the French; and reeled raw silks, unsurpassed by the best Italian. The high cost of these shows, indeed, that her improved manufactures are but in their infancy; but it also shows that the country possessing the greatest natural resources of any country in Europe has started in that race where indomitable determination—the strongest characteristic of the Mussulman—is the sure guarantee of success.

Arrived at nearly the same point in her retrogression from industrial independence that Turkey has reached in her advance towards it, Spain exhibited in her compartments the melancholy evidences of decadence from greatness. She who once ruled a dominion as wide as Britannia, to whom argosies came laden with the spoils of the Old World and New, who held the Netherlands by her armies, in spite of Louis XIV., and sent her armada, styled invincible, to chastise England, upon the great arena of industrial competition in the nineteenth century, held the place of but a third-rate power. A few sword blades from the oldest forges in Europe, a few beautiful silk fabrics from the once-renowned works of Talavera, a few samples of common cloths from Segovia, an imperfect representation of the manufactures of hemp and flax, specimens of cordage and sail cloths, and an indifferent collection of grains, marbles, metals, and earths, constituted the main portion of the products from the peninsula.

Not unlike Spain in the meagre display of textile fabrics, but surpassing her in the show of raw materials and produce, Portugal held also but an inferior position in the great Exhibition. There were, however, fine carvings in ivory, indicative of much skill in execution, a few interesting works in the precious metals, and the great oil jar from Alentejo, to draw attention to the small division she occupied.

Italy, as a whole, was not represented. Sardinia, Tuscany, and the papal States, were congregated, as independent sovereignties, among the other nations of the world; but neither Naples of modern days, nor Italy of ancient glory, possessed a local habitation or a name in the Crystal Palace. It is significant of much to the reflecting mind, that from the papal States two sections only were represented, viz: raw materials and sculpture. Among the former were silicious quartz, asphalte, and alum; and among the latter, sculptures, cameos in onyx and shell, and beautiful mosaic work from the Vatican. Tuscany seemed to be awakening from her sleep, and, by the samples which she sent of the products of her mines and her soil, to give earnest of efforts towards better days. Though the industrial superiority which she held during the middle ages, when the most powerful nations of Europe were her tributaries, can never be regained, she may yet—from her timber, (the best in Europe,) her marbles, and her metallic ores—from which the boracic acid of commerce is almost exclusively obtained—again enjoy an enviable pre-eminence. Even in advance of her, in all that pertains to the true greatness of nations, was her sister State, Sardinia. Nearly one hundred exhibitors represented her industry. A liberalist in opinion and action, in the highest and best sense of the word, came to preside over her interests. Sixty operatives—intelligent young mechanics and artisans, supported by the government—studied those lessons of practical knowledge in the Exhibition which would be most serviceable to home industry. Her contributions afforded good evidence of improving labor. To say nothing of her pharmaceutical specimens, unsurpassed by any nation, or of her rich mineralogical show, there was nothing throughout the Exhibition to equal the filigree and chased silver work from Turin, or to surpass the products of the velvet looms of Genoa. Success to all activity which impels the industry of Italy towards better days! Among the fine arts, still clinging to their ancient home, and recalling, even in their degeneracy, the traces of a nobler inspiration and a happier era, was a piece full of meaning—a matron teaching her children to walk alone, emblematic of “Young Italy.”

Next in order of location came the collection of France, the most attractive and extensive of any in the foreign department, and in more points than one rivalling that of the United Kingdom. It would be vain to attempt, in this brief notice, to indicate even the principal features of this congress of French industry. Among the raw materials, silk, in every variety of process, claimed general admiration. Hemp, wool, and other textile materials were amply displayed. The delicate chemical preparations, the grosser products, the cements and paints, the metals and metallic manipulations, the prepared food and simple grains, made an interesting exhibition of themselves. The machinery department, from the huge water-wheel down to the kitchen bellows; the department of manufactures, from the gorgeous tapestry of the Gobelin's looms to the embroidered garter; the department of ceramic manufactures, from the service of Sevres china, too costly for money to purchase, down to the newest pattern of baking dishes; the department of fine arts, from the group of Cain and his Family, to the blurred and lifeless talbotype; and the rich department of jewelry, from the jewels of her majesty the Queen of Spain to the plain wedding ring of the peasant—each one, in its time and place, through all its most minute ramifications, skillfully

arranged, and in every respect full of artistic feeling, was apparently complete. It is a peculiar characteristic of French industry, that all its products touch upon the wants, the comforts, and the luxuries of the million. They deal alike in the beauty of the cottage and the embellishment of the palace. Their bronzes, their lamps, and chandeliers, and candelabra, their furniture, their cambrics, shawls, and silks, even the most ordinary products of the shops, are with them works of art, rather than results of industry. While they do not neglect the demands of trade, it is the glory of France that her workmen aspire in everything to purity of design. The features of her character are imprinted upon all she produces; there being no more perfect picture of the great nation than is to be seen in her works of industry.

Belgium showed machinery and iron work, agricultural implements, carpets, and wood carvings, proving her right to be considered a first rate manufacturing country. Perhaps there is not in the world, as the various results of their industry show, a more industrious, artistic, or pains taking people.

The show of Austria, if the productions of her Italian possessions were to be accounted hers, was magnificent. Her furniture was unequalled for richness and splendor; her Bohemian glass sustained its world-wide reputation for beauty; her statuary exhibited a vigor and excellence unapproached; and her lithographers proved, by their contributions, that they led the world.

The German collection, from the numerous States of the Zoll Verein, wanting in that variety and expansiveness which mark the industrial developments of the great western States of Europe, showed a force and enterprise of the manufacturing spirit which bid fair to supplant England and France in the markets of the world. In the element of cheapness in production, none can equal the Germans. The "Amazon" and "Libusa," and other marks of statuary, testified that in higher art there is possessed by her sculptors energy and earnestness of expression, both characteristic of her people and approaching the sublime. In hardware and cutlery, in textile fabrics of the cheaper kind, and in medium porcelain, the States of Germany are destined to be the workshop of the world.

Of Norway, Sweden, Denmark, and Switzerland, it is unnecessary to say more than that each, in its industrial products, reflected its peculiar national characteristics. This, too, was equally true of Russia. From these, the grand, and striking, and regal, only came. The seal of the autocrat was stamped on everything. In all the beauty and magnificence, and costliness, and display of the Russian division, one saw nothing of the people. It was an exhibition of the enterprise of the executive—of the power of the sovereign—of the resources of the exchequer. It is not intended to be said that no individual contributions were received from Russia. The costly vases made, malachite doors, and heavy silks, were many of them the production of manufactories built up by private enterprise; but in even these the hand of an absolute power was everywhere apparent, encouraging or restraining—tempting forward by the hope of reward, or holding back by the fear of punishment.

Perhaps the industrial products of no two countries which ever existed presented so many points of strong contrast as did those of Russia and

the United States at the Exhibition. In the one case, everything which was shown was costly; in the other, cheap. The compartments of Russia, splendidly fitted up and appointed, were attractive from the princely magnificence of the articles displayed. The compartments of the United States, on the contrary, decorated with great plainness, drew admiration from those who visited them by the adaptability of everything they contained to the purposes for which they were intended. Thousands never ceased to gaze with wonder on jewels, embroidery, velvets, silks, and furs, contributed from the various imperial establishments of St. Petersburg and Moscow. There were others, however—and they, too, were counted by thousands before the Exhibition closed—who found—in the water pails, made by machinery, and furnished at one-quarter the usual price; in the pegged boots and shoes, between the upper leather and soles of which not a waxed end was drawn; in the improved household, barn, garden, and field implements; in the bell telegraphs, and spring chairs, and cooking ranges, and hot air furnaces, and camp bedsteads—a degree of intelligent interest excited by the display in no other part of the building. The Russian exhibition was a proof of the wealth, power, enterprise, and intelligence of Nicholas; that of the United States an evidence of the ingenuity, industry, and capacity of a free and educated people. The one was the ukase of an emperor to the notabilities of Europe; the other the epistle of a people to the workingmen of the world.

The history of our portion of the exhibition—of the lack of all pecuniary aid from the government, of its early discouragements, vicissitudes, and trials, of its gradual emerging from darkness, of its stoutly-fought battles, its victories and success, and of its hardly but fairly won honors at the close—is all too well known to the whole world to need recapitulation here. It is sufficient to say that we were not misunderstood. We might have sent far more of our productions to England; but that would only have confirmed, not altered, the verdict which the world has given us. We alone, of all people, exhibited the products of unfettered, untaxed, unpatronized labor. We showed the results of pure democracy upon the industry of men. We demonstrated the progressiveness of the human mind when in the enjoyment of liberty. And we alone, from among the assemblage of two-score nations, bore away the palm for intelligent labor.



XI.

INFORMATION

TO

PERSONS HAVING BUSINESS TO TRANSACT

AT THE

PATENT OFFICE.



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INFORMATION

TO PERSONS HAVING BUSINESS TO TRANSACT AT THE

UNITED STATES PATENT OFFICE.

SEC. 1. OF THE FORMS PRESCRIBED BY LAW, AND THE RULES
ADOPTED BY THE OFFICE.

The following forms and rules are founded, the first upon positive law, and the second upon the constructive power the Commissioner has to issue such orders as will secure impartial justice to applicants and facilitate the transaction of business.

The laws now in force relative to patents are those approved July 4, 1836; March 3, 1837; March 3, 1839; August 29, 1842; May 27, 1848; March 3, 1849; and March 3, 1851.

The forms resting upon these are fixed, and cannot, of course, be varied without the intervention of Congress; but rules, having their origin in the Commissioner, can be revised or modified at his discretion.

SEC. II. FOR WHAT PATENTS MAY BE GRANTED.

By the act of 1836, section 6, patents were granted for any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement on any art, machine, manufacture, or composition of matter, not known or used by others before the applicant's discovery or invention thereof, and not, at the time of his application for a patent, in public use, or on sale, with his consent or allowance as the inventor or discoverer; but, by the act of 3d March, 1839, no patent is held to be invalid by reason of the purchase, sale, or use [of the invention] prior to the application for a patent, except on proof of abandonment of such invention to the public, or that such purchase, sale, or public use has been for more than two years prior to such application for a patent.

By the 3d section of the act of 1842, patents are also granted for new and original *designs*:

1. For a manufacture, whether of metal or other material.
 2. For the printing of woollen, silk, cotton, or other fabrics.
 3. For busts, statues, or bas reliefs, or composition in alto or basso relievo.
 4. For any impression or ornament (whether complete in itself, or) to be placed on any article of manufacture in marble or other material.
 5. For any new and original pattern, or print, or picture, to be either worked into or worked on, or printed or painted, or cast or otherwise fixed on, any article of manufacture.
 6. For any new shape or configuration of any article of manufacture.
- All such designs not being previously known or used by others.

SEC. III. TO WHOM PATENTS MAY BE GRANTED.

Patents are granted to citizens of the United States; to aliens who shall have been resident in the United States one year next preceding, and shall have made oath of their intention to become citizens thereof; to one or more assignees of entire patent rights; to administrators and executors, and to foreign inventors or discoverers, but the law makes no provision for granting to the latter patents for new and original *designs*.

In case of the decease of an inventor, before he has obtained a patent for his invention, "the right of applying for and obtaining such patent shall devolve on the administrator or executor of such person in trust for the heirs at law of the deceased, if he shall have died intestate; but if otherwise, then in trust for his devisees, in as full and ample manner, and under the same conditions, limitations, and restrictions, as the same was held, or might have been claimed or enjoyed, by such person in his or her lifetime; and, when application for a patent shall be made by such legal representatives, the oath or affirmation shall be so varied as to be applicable to them."

Joint inventors are entitled to a joint patent; but neither can claim one separately.

SEC. IV. OF APPLICATIONS FOR PATENTS.

Of the propriety of making an application for a patent, the inventor or his agent must be the sole judge. The Patent Office is open, the records and models may be consulted during office hours, and the applicant can personally, or by attorney, satisfy himself of the expediency of filing his papers.

Further than the facilities thus afforded, the office can yield no assistance until the case is regularly before it in manner prescribed by law.

By the act of July 4, 1836, entitled "An act to promote the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose," a principle entirely new was engrafted upon the system under which patents had been previously granted.

Under the provisions of this act it was made the duty of the Commissioner of Patents, on the receipt of any application for a patent, to institute "an examination of the alleged new invention or discovery," with a view to determine whether the same had been before "invented or discovered by any other person in this country," or "patented or described in any printed publication in this or any foreign country." Thus was the grant of patents in future restricted to such "inventions or discoveries" as were *new*, in the most absolute

sense of the term, and a very laborious and responsible duty imposed upon this office. In aid of the solution of the question of *novelty*, thus raised on every application, the applicant was required to furnish a full and clear description of his invention, signed, witnessed, and verified by his oath, accompanied by a model and drawings of the same; all being deemed necessary in order to illustrate his claim to a patent. Furnished with these illustrations, the office was then required to go into a rigorous and extended examination, taking in the whole range of history on the given subject, whether its evidences were to be found in patents granted, caveats filed, or descriptions published, in this or in any foreign country, in any period of time.

In the conduct of these examinations, it is necessary to keep in constant and laborious employment a number of persons specially selected for their knowledge and skill in the arts; to refer with guarded care to caveats filed in the secret archives of the office, and which can only come into view on such occasions; to patents already granted, and to such works on the arts as have been published here or elsewhere; and also to keep pace with the current of invention throughout the world, by a constant and copious supply of such publications, in this country and in Europe, as are devoted to this object.

It will readily be seen that this office cannot undertake to respond to the numerous inquiries *CONSTANTLY addressed to it*, whether such or such an invention is new, and whether a patent can be obtained for it; because every such inquiry involves the *whole question of novelty*; and before the office could express, or even form, an opinion, the same range of rigorous examination now required by law on a regular application would be necessary, and this, too, without illustration. Such inquiries are based on very imperfect general descriptions; while, in applications for patents, the law requires that the office shall have the aid, not only of clear and full description, under oath, but also accurate drawings and models, before it shall decide the question whether, in any given case, the invention be *new*, &c. The attempt to answer such interrogatories would effectually interrupt the business of the office, and be a direct infringement on the rights of those who apply for patents, as the examinations of their applications must necessarily be suspended; moreover, it would be prejudging cases, and be a violation of law.

There is another class of inquiries which, for the reasons above enumerated, cannot meet with a response from this office, viz: inquiries founded upon brief and imperfect descriptions, propounded with a view to ascertain whether such alleged improvements have been patented, and, if so, to whom; nor can the office respond to inquiries touching pending or rejected applications (unless they have been withdrawn) without the consent of the applicants in writing.

The office is frequently called upon to explain certain principles of Patent law, to give information as to modes of procedure in the protection of patents, and suits for infringements, and also as to the value of a patented invention, and upon a variety of topics concerning the rights of patentees and others. The office cannot act as counsellor for individuals, nor as an expounder of law, except in reference to questions arising within the office; and the extent of information that can be given in these cases, is to forward a copy of Patent laws and the usual printed official circular.

It is hoped that this information will prove satisfactory. It will be distinctly understood that, in declining to respond to the class of inquiries above stated, this office acts under the necessity of the case, and not from any disposition to withhold information.

In presenting an application for a patent, much disappointment and delay will be avoided by attending to the following directions: 1st. The *petition* should be made to the *Commissioner*, praying that a patent may be granted for the invention. 2d. The *specification* should be filed, describing, as clearly and concisely as possible, the improvement made. 3d. The *oath* or *affirmation*

should be made to the originality of the invention. 4th. *Drawings*, when the nature of the case admits of them, should accompany the application. 5th. The *model or specimen*, as the case may be, clearly representing the improvement, should be deposited; and, 6th. The *fee* required by law should be paid, and in manner pointed out in section XVIII.

Owing to the great increase of business in this office, and in order to prevent all possibility of mistake as to the fact whether an application is complete, it has become necessary to put an end to the practice of receiving cases in detached portions at various times. It is now often the case that the fee is paid at one time, the papers forwarded at another, the drawing at a third, and the model delivered at still a different period. Long intervals are often suffered to elapse between each stage of the procedure, and it is necessary at each step to search the books of the office to ascertain what the party has done before.

In the multitude of applications, this state of things leads to the expenditure of much time, and, in case of similarity of names of parties, or of the character of inventions, is liable to be a cause of error. I have, therefore, deemed it necessary to adopt the following rule, which will be enforced on and after May 1, 1850:

All the papers and the fee in each application must be filed in this office at the same time, whether they be delivered by the applicant or his agent, or forwarded by mail; and in those cases where the party or his agent is in this city, then the model must be delivered at the same time. If the party or his agent is not on the spot, the model can be forwarded at their convenience.

This office cannot refuse to receive such papers and fees as may be forwarded to it at different intervals, but parties who persist in such a course are warned that this office will, hereafter, not acknowledge the receipt of the same, nor hold itself responsible for any errors that may arise from such irregular proceedings.

Not until these requirements are *faithfully and minutely fulfilled*, according to the instructions hereafter given, can *any case* receive the action of the office.

1st. *Of the petition*.—The inventor, having made a useful invention of discovery, must make application, in writing, to the Commissioner, signifying his desire of obtaining an exclusive property therein, and praying that a patent may be granted therefor. The usual form is annexed. The petition *must* be signed by the applicant.

FORM OF PETITION.

To the COMMISSIONER OF PATENTS:

The petition of John Fitch, of Philadelphia, in the county of Philadelphia, and State of Pennsylvania—

RESPECTFULLY REPRESENTS:

That your petitioner has invented a new and improved mode of preventing steam-boilers from bursting, which he verily believes has not been known or used prior to the invention thereof by your petitioner. He therefore prays that letters patent of the United States may be granted to him therefor, vesting in him and his legal representatives the exclusive right to the same, upon the terms and conditions expressed in the act of Congress in that case made and provided; he having paid thirty dollars into the treasury, and complied with the other provisions of the said act.

JOHN FITCH.

2d. *Of the specification.*—He must then deliver a written description of his invention or discovery, and of the manner and process of making, constructing, using, and compounding the same, in such full, clear, and exact terms, avoiding unnecessary prolixity, as to enable any person skilled in the art or science to which it appertains, or with which it is most clearly connected, to make, construct, compound, and use the same; and in case of any machine, he shall fully explain the principle, and the several modes in which he has contemplated the application of that principle or character by which it may be distinguished from other inventions; and shall particularly specify and point out the part, improvement, or combination which he claims as his own invention or discovery.

It is important, in all cases, to have the specification describe the sections of the drawings, and refer by letters to the parts. The following is the form adopted by the office:

FORM OF SPECIFICATION.

To all whom it may concern :

Be it known that I, John Fitch, of Philadelphia, in the county of Philadelphia, the State of Pennsylvania, have invented a new and improved mode of preventing steam-boilers from bursting, and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in providing the upper part of a steam-boiler with an aperture in addition to that for the safety-valve; which aperture is to be closed by a plug or disk of alloy, which will fuse at any given degree of heat, and permit the steam to escape, should the safety-valve fail to perform its functions.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation: I construct my steam-boiler in any of the known forms, and apply thereto gauge-cocks, a safety-valve, and the other appendages of such boilers; but, in order to obviate the danger arising from the adhesion of the safety-valve, and from other causes, I make a second opening in the top of the boiler similar to that made for the safety-valve, as shown at A, in the accompanying drawing; and in this opening I insert a plug or disk of fusible alloy, securing it in its place by a metal ring and screws, or otherwise. This fusible metal I, in general, compose of a mixture of lead, tin, and bismuth, in such proportions as will insure its melting at a given temperature, which must be that to which it is intended to limit the steam, and will, of course, vary with the pressure the boiler is intended to sustain. I surround the opening containing the fusible alloy by a tube, B, intended to conduct off any steam which may be discharged therefrom. When the temperature of the steam, in such a boiler, rises to its assigned limit, the fusible alloy will melt, and allow the steam to escape freely, thereby securing it from all danger of explosion.

What I claim as my invention, and desire to secure by letters patent, is the application to steam-boilers of a fusible alloy, which will melt at a given temperature, and allow the steam to escape, as herein described, using for that purpose the aforesaid metallic compound, or any other substantially the same, and which will produce the intended effect.

JOHN FITCH.

Witnesses—

ROBERT FULTON,

OLIVER EVANS.

When the application is for a machine, the specification should commence thus:

Be it known, that I, _____ of _____, in the county of _____, and State of _____, have invented a new and useful machine for— [stating the use and title of the machine; and if the application is for an improvement, it should read thus: a new and useful improvement on a, or on the, machine, &c.]—and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same: reference being had to the annexed drawings, making a part of this specification, in which figure 1 is a perspective view, figure 2 a longitudinal elevation, figure 3 a transverse section, &c., (thus describing all the sections of the drawings, and then referring to the parts by letters. Then follows the description of the construction and operation of the machine, and ending with the claim, which should express the nature and character of the invention, and identify the parts claimed separately or in combination. If the specification is for an improvement, the original invention should be disclaimed, and the claim confined to the improvement.) The specification must be signed by the inventor.

3d. *Of the oath or affirmation.*—"Every inventor, before he can receive a patent, must make oath or affirmation that he does verily believe that he is the original and first inventor or discoverer of the art, machine, manufacture, composition, or improvement, for which he solicits a patent; and that he does not know or believe that the same was ever before known or used; and also of what country he is a citizen." In every case the oath or affidavit must be made before a person having general powers to administer oaths. Justices of the peace have not, in all cases, this general power.

The oath required from applicants for patents may be taken, when the applicant is not, for the time being, residing in the United States, before any minister plenipotentiary, chargé d'affairs, consul, or commercial agent holding commission under the government of the United States, or before any notary public of the foreign country in which such applicant may be.

If the applicant be an alien, and have resided one year in the United States next preceding the application, and have given legal notice of his intention to become a citizen of the United States, he must make oath to these facts before he can apply for a patent for the same fee as that paid by a citizen.

FORM OF OATH.

CITY AND COUNTY OF PHILADE }
State of Pennsylvania, } ss.

On this _____ day of _____, 185____, before me, the subscriber, a _____ personally appeared the within named John Fitch, and made solemn oath [or affirmation] that he verily believes himself to be the original and first inventor of the mode herein described for preventing steam-boilers from bursting; and that he does not know or believe the same was ever before known or used; and that he is a citizen of the United States.

Signed,

A. B.

A foreigner should make oath of what country he is a citizen. An alien resident should make oath that he has resided in the United States one year next preceding his application for letters patent, and has made oath of his intention to become a citizen thereof.

4th. *Of the Drawings.*—The law requires that "the applicant for a patent shall accompany his application with drawings and written references, when

the nature of the case admits of drawings." These drawings should, in general, be in perspective, and neatly executed on sheets of drawing-paper; and such parts as cannot be shown in perspective must, if described, be represented in plans, sections, or details. *Duplicates* are required if a patent issues—one being attached to the patent, and the other placed on file in the office. An examination, as to originality of invention, may be made on a single drawing, when no agent is employed; but in all cases presented by agents or attorneys, duplicate drawings must be filed before any examination can be had. They must be signed by the patentee, and attested by two witnesses, except when the specification describes the sections or figures, and refers to the parts by letters; in which case they are neither required to be signed nor accompanied by written references, the whole making one instrument. Drawings are absolutely necessary when the case admits of them. They must be on separate sheets, distinct from the specification, and one at least must be made on stiff drawing-paper, in fast colors.

The Patent Office does not make original drawings to accompany applications for patent. It furnishes copies of the same only after the patent is completed. Draughtsmen in the city of Washington are always ready to make drawings at the expense of the patentees.

5th. *Of the Model or Specimen.*—Every application must be accompanied by a model when the invention admits of one. It must be neatly and substantially made, of durable material, and, if possible, not over one cubic foot in contents. In case models are made of pine, or other soft wood, they should be painted, stained, or varnished. The name of the inventor (and assignee, if assigned) must be printed or engraved upon or fixed to it in a durable manner.

When the invention is of a "composition of matter," the law requires that the application be accompanied with specimens of the ingredients, and of the composition of matter, sufficient in quantity for the purpose of experiment.

Models and specimens forwarded without a name cannot be entered on record, and are therefore liable to be lost or mislaid.

Models, if deposited with any of the following agents, will be forwarded to the Patent Office free of expense :

The Collector of the port of Portsmouth, New Hampshire.

The Collector of the port of Portland, Maine.

The Collector of the port of Burlington, Vermont.

The Collector of the port of Providence, Rhode Island.

The Collector of the port of Boston, Massachusetts.

The Collector of the port of Hartford, Connecticut.

The Collector of the port of New York.

The Collector of the port of Philadelphia, Pennsylvania.

The Collector of the port of Baltimore, Maryland.

The Collector of the port of Richmond, Virginia.

The Collector of the port of Charleston, South Carolina.

The Collector of the port of Savannah, Georgia.

The Collector of the port of New Orleans, Louisiana.

The Collector of the port of Detroit, Michigan.

The Collector of the port of Buffalo, New York.

The Surveyor at St. Louis, Missouri.

The Collector of the port of Cleveland, Ohio.

The Surveyor at Pittsburg, Pennsylvania.

The Surveyor at Cincinnati, Ohio.

The Surveyor at Louisville, Kentucky.

Agents must send models received by them by packet, when the same are forwarded at the expense of the office

If applicants prefer to have their models transmitted by express, instead of by packet, they must in all cases pay the expense of transportation. Neither models nor specimens must, under any circumstances, be sent by mail. (See Sec. XX.)

The transmission of models by the agents extends to those for new applications, as well as those restored in consequence of the destruction of the originals.

Models of unpatented machines, specimens of compositions and of fabrics, and other manufactures or works of art, will be received and arranged in the National Repository of the Patent Office.

6th. *Of fees payable for a Patent.*—The fee payable on an application for a patent by a citizen of the United States, or by a foreigner who has resided in the United States one year next preceding the application, and has made oath of his intention to become a citizen, is *thirty dollars*; by a subject of Great Britain, *five hundred dollars*; by any other foreigner, *three hundred dollars*.

In a case of a total assignment, before the patent issues, of his invention by a foreigner to a citizen of the United States, the same fee is required as if the patent issued to the inventor himself.

Instructions in regard to the manner of paying these fees may be found in Sec. XVIII of this pamphlet.

The above six pre-requisites having been complied with, the application is ready for examination. But the neglect of any one of them, or of the instructions relative thereto, will be sufficient to delay the action of the office until they have been satisfactorily fulfilled.

If the following questions can be answered affirmatively before transmitting the papers, few applications will be returned for correction:

1st. Is the petition signed by the applicant and addressed to the Commissioner of Patents?

2d. Is the specification signed and attested by two witnesses, and does it contain a specific claim?

3d. Has the inventor made oath of his citizenship, and in accordance with instructions and forms given above?

4th. Are the drawings described and referred to in the specification? If not, are they signed before two subscribing witnesses, and accompanied by written references? Are duplicates sent?

5th. Has the model (or specimen) been deposited, and is the name of the inventor and assignee, if the invention be assigned, durably affixed thereto?

6th. Is the fee remitted, and in manner prescribed in Sec. XVIII?

SEC. V. OF THE PROCEEDINGS DURING EXAMINATION.

Applications are examined and patents issued in the order in which the proper documents are completed, except in cases in which the claims so nearly resemble those undergoing examination as to render an interference probable; in which case they will be taken up and examined with the cases then under examination.

A decision deliberately made and affirmed by one Commissioner cannot be disturbed by his successor. Some years since, the evils arising from such revisions became so apparent and embarrassing, that a positive rule to that effect was adopted. It was submitted to, and approved by, the President of the United States.

This office, therefore, cannot, except under extraordinary circumstances, disturb decisions so re-affirmed, but must refer all who consider themselves

aggrieved to their remedy by appeal; for instructions with regard to which, or withdrawal, see Sec. VI, par. 3 and 4. For instructions relative to interfering applications, Sec. VI, par. 5.

A *defective* specification or drawing may be amended at any time before a patent has issued; in which case the applicant will be required to make oath anew. In case papers are withdrawn from the office for alteration or amendment before examination, the application will take its turn for examination as a *new case* filed on the day of the reception of the altered or amended papers.

In case specifications and drawings should be found defective, they are returned to the applicant, with instructions to amend. When returned to the office, they are again examined; the examination in such cases taking precedence of all new cases on hand at the time of their reception. But if, on such examination, it should be found that the instructions to amend have been disregarded, or not properly attended to, the papers are again returned to the applicant; and, upon their second return to the office, the examination of such papers is delayed until all the business on hand at the time of their reception is disposed of.

When papers are thus returned to applicants for amendment, should they find it necessary, or deem it important, to prepare new documents in order to make suitable amendments, *the original papers must be returned to the office together with the amended or new papers*; otherwise, examination upon such cases will be delayed until the original papers are received by the office.

After an application has been examined, no alteration made in the character of the invention can be considered under the same fee. Any such alteration requires a new fee, papers, &c., before examination can be had.

In general, if any addition is to be made to an invention duly before the office, or any change in its character, the applicant must withdraw and file his application anew.

The personal attendance of an applicant at the Patent Office is unnecessary. The business can be done by correspondence or by attorney. All explanations and suggestions in relation to pending and to all other cases should be in writing, addressed to the Commissioner. Correspondence with the examiners, or other subordinates, is strictly prohibited.

When an application has been *finally decided*, the office will retain the original papers, allowing the applicant to obtain copies thereof

SEC. VI. OF THE RESULTS OF AN EXAMINATION.

1st. *If the claim or claims be allowed.*—If a patent issues, it is transmitted to the inventor or his agent. If to the latter, he must have filed a full power of attorney authorizing him to receive it. In case an assignment be made of the entire patent right, the patent will be sent to the assignee or his attorney.

2d. *If the claim be rejected.*—In cases of rejection, such references are made in the official communication as, in the opinion of the office, justify its decision. If the applicant is satisfied with the grounds of rejection, he may withdraw his application; if, on the contrary, he still deems himself entitled to a patent, he can request a reconsideration of the case, provided the references and arguments relied upon by the office as grounds of rejection have been carefully considered by him; and explanations, whether verbal or in writing, based upon the inapplicability of the one, or the unsoundness of the other, may be received at any convenient time. These are the only grounds upon which an application can be reconsidered, and this final action in the case cannot be had until it comes up in its turn as a case presented anew. If the applicant is

still dissatisfied, he can appeal from the decision of the Commissioner, as prescribed by law.

3d. *Of the withdrawal.*—When either an American or foreign application is rejected, and the applicant relinquishes his claim, and desires to avail himself of the provisions of the 7th section of the act of 1836, and the 12th section of the act of 1837, he must petition the Commissioner of Patents, stating the abandonment of his application; in which case two-thirds of the original fee will be returned. The model and papers are retained by the office; and if the latter have been withdrawn for correction, or for any other purpose, they must be returned to their files before a withdrawal of two-thirds of the fee can be allowed. No money is, however, refunded on the withdrawal of an application after an appeal has been taken from the decision of the Commissioner, nor any part of the fees received on filing caveats, or applications for additional improvements, or for reissues, or for extensions, or for designs.

In withdrawing an application the following forms may be followed:

To the COMMISSIONER OF PATENTS:

SIR: I hereby withdraw my application for a patent for improvements in the cotton-gin, now in your office, and request that twenty dollars may be returned to me, agreeably to the provision of the act of Congress authorizing such withdrawal.

ELI WHITNEY.

CABOTVILLE, MASS., July 16, 1849.

Received of the Treasurer of the United States, per Thomas Ewbank, Commissioner of Patents, twenty dollars, being the amount refunded on withdrawing my application for a patent for improvements in the cotton-gin.

ELI WHITNEY.

CABOTVILLE, MASS., July 16, 1849.

As the law does not allow public moneys to be paid in *bank bills*, or by *draught on banks*, particular instructions should be given by the person withdrawing as to the manner in which the money shall be paid—*i. e.*, whether to his order at this office, or remitted by mail, *in gold, at his risk*. Money in *gold* and *silver* only is receivable and payable at this office.

4th. *Of appeal.*—When a patent is refused by the Commissioner, the applicant can have remedy by an “appeal to the Chief Justice of the District Court of the United States for the District of Columbia,” by giving notice thereof to the Commissioner, and filing in the Patent Office, within such time as the Commissioner shall appoint, his reasons of appeal, specially set forth in writing, and also paying into the Patent Office, to the credit of the Patent Fund, the sum of twenty-five dollars, in manner prescribed in section XVIII.

“And it shall be the duty of said Chief Justice, on petition, to hear and determine all such appeals, and to revise such decisions in a summary way, on the evidence produced before the Commissioner, at such early and convenient time as he may appoint, first notifying the Commissioner of the time and place of hearing, whose duty it shall be to give notice thereof to all parties who appear to be interested therein, in such manner as said Judge shall prescribe. The Commissioner shall also lay before the said Judge all the original papers and evidence in the case, together with the grounds of his decision, fully set forth in writing, touching all the points involved, by the reasons of appeal, to which the revision shall be confined; and, at the request of any party interested, or at the desire of the Judge, the Commissioner, and the Examiners in the Patent Office, may be examined, under oath, in explanation of the principles of the machine, or other thing, for which a patent in such case is prayed

[for.] And it shall be the duty of said Judge, after a hearing of any such case, to return all the papers to the Commissioner, with a certificate of his proceedings and decision, which shall be entered on record in the Patent Office; and such decision, so certified, shall govern the further proceedings of the Commissioner in such case: *Provided, however,* That no opinion or decision of the Judge in any such case shall preclude any person interested in favor [of] or against the validity of any patent which has been or may hereafter be granted, from the right to contest the same in any judicial court, in any action in which its validity may come in question."

In cases of appeal it has been decided by the said Chief Justice that the case must be dismissed, unless the "reasons of appeal" are filed in the Patent Office within the time prescribed by the Commissioner, and that no further reasons or argument in writing, or otherwise, and no answer to the grounds of the Commissioner's decision, can be received, heard, or considered afterwards; but that the appeal must be decided upon the papers filed in the Patent Office, and the written grounds of the Commissioner's decision. Notice of this decision is given because a practice somewhat different has heretofore prevailed.

In cases where patents are refused for any reason whatever, either by the Commissioner of Patents or by the Chief Justice of the United States court for the District of Columbia, remedy can be had by bill in equity; "and the court having cognizance thereof, on notice to adverse parties," (and when there shall be no adverse party a copy of the bill shall be served upon the Commissioner of Patents, when the whole of the expenses of the proceedings shall be paid by the applicant, whether the final decision shall be in his favor or otherwise,) "and other due proceedings had, may adjudge and declare either the patent void in the whole or in part, or inoperative and invalid in any particular part or portion of the United States, according to the interest which the parties to such suit may possess in the patent or the inventions patented; and may also adjudge that such applicant is entitled, according to the principles and provisions of this act, to have and receive a patent for his invention, as specified in his claim, or for any part thereof, as the fact of priority of right or invention shall, in any such case, be made to appear. And such adjudication, if it be in favor of the right of such applicant, shall authorize the Commissioner to issue such patent, on his filing a copy of the adjudication, and otherwise complying with the requisitions of this act: *Provided, however,* That no such judgment or adjudication shall affect the rights of any person except the parties to the action, and those deriving title from or under them, subsequent to the rendition of such judgment."

It has recently been decided, in the district court of Eastern Pennsylvania, that all proceedings in equity against the Commissioner of Patents must be commenced and prosecuted in the courts of the District of Columbia; no court out of the District having jurisdiction over the subject matter.

Before appealing from the decision of the Commissioner, the oath of invention must be renewed.

5th. *Of interfering applications.*—Whenever an application is presented for a patent which, in the opinion of the Commissioner, would interfere with any other patent for which an application may be pending, or with any unexpired patent which shall have been granted, it shall be the duty of the Commissioner to give notice thereof to such applicants or patentees, as the case may be; and if either shall be dissatisfied with the decision of the Commissioner on the question of priority of right or invention, on a hearing thereof, he may appeal from such decision on like terms and conditions as are provided in the case of applications for inventions not new; and the like proceedings shall be had to determine which, or whether either, of the applicants is entitled to receive a patent as prayed for.

In contested cases, the following rules have been established for taking and transmitting evidence :

1st. That all statements, declarations, evidence, &c., shall be in writing, setting forth, minutely and particularly, the point or points at issue, and shall be verified by oath or affirmation.

2d. That all statements, declarations, proofs, and evidence shall be filed in the Patent Office by the parties, respectively, before the day of hearing.

3d. That, before the deposition of a witness or witnesses be taken by either party, notice should be given to the opposite party of the time and place when and where such deposition or depositions will be taken, so that the opposite party, either in person or by attorney, shall have full opportunity to cross-examine the witness or witnesses. And such notice shall, *with proof of service of the same*, be attached to the deposition or depositions, whether the party cross-examine or not; and such notice shall be given in sufficient time for the appearance of the opposite party, and for the transmission of the evidence to the Patent Office before the day of hearing.

4th. That all evidence, &c., shall be sealed and addressed to the Commissioner of Patents, by the persons before whom it shall be taken, and so certified thereon.

5th. That the certificate of the magistrate taking the evidence shall be substantially in the following form, and written upon the envelope, viz :

"I hereby certify that the depositions of A B, C D, &c., relating to the matter of interference between E F and G H, were taken, sealed up, and addressed to the Commissioner of Patents by me.

"A B, *Justice of the Peace.*"

6th. In cases of extension, where no opposition is made, *ex parte* testimony will be received from the applicant; and such testimony as may have been taken by the applicant, prior to notice of opposition, shall be received: *Provided*, The applicant shall give prompt notice to the opposing party or parties of the names and residences of the witnesses whose testimony has been thus taken.

7th. That no evidence, statement, or declaration, touching the matter at issue, will be *considered* upon the said day of hearing, which shall not have been taken and filed in compliance with these rules: *Provided*, That if either party shall be unable, for good and sufficient reasons, to procure the testimony of a witness or witnesses within the stipulated time, then it shall be the duty of said party to give notice of the same to the Commissioner of Patents, accompanied by statements, *under oath*, of the cause of such inability, and of the *steps* which have been taken to procure said testimony, and of *the time or times* when efforts have been made to procure it, which last-mentioned notice to the Commissioner shall be received by him previous to the day of hearing aforesaid.

SEC. VII. OF ADDITIONAL IMPROVEMENTS

"Whenever the original patentee shall be desirous of adding the description and specification of any new improvement of the original invention or discovery, which shall have been invented or discovered by him subsequent to the date of his patent, he may, like proceedings being had in all respects as in the case of original applications, and on the payment of fifteen dollars, as hereinafter mentioned, have the same annexed to the original description and specification; and the Commissioner shall certify, on the margin of such annexed description and specification, the time of its being annexed and re

corded; and the same shall thereafter have the same effect in law, to all intents and purposes, as though it had been embraced in the original description and specification.

In all such cases the claim in the original patent is subject to a re-examination; and, if it shall appear that any part of the claim was not original at the time of granting the patent, a disclaimer of said part must be filed in the Patent Office, or the specification of claims restricted, by having the patent reissued before the improvement can be added. If the improvement cannot be added, it may, if patentable, be secured by a separate patent, on the payment of the fee of thirty dollars. If the patent was granted before the 15th of December, 1836, a model and drawings of the invention, as first patented, verified by oath, must be furnished, unless dispensed with by the Commissioner.

FORM FOR ADDITION OF NEW IMPROVEMENTS.

To the COMMISSIONER OF PATENTS:

The petition of James Rumsey, of the county of Berkely, and State of Virginia—

RESPECTFULLY REPRESENTS:

That your petitioner did obtain letters patent of the United States for an improvement in the boilers of steam-engines, which letters patent are dated on the first day of March, 1835; that he has, since that date, made certain improvements on his said invention; and that he is desirous of adding the subjoined description of his said improvements to his original letters patent, agreeably to the provisions of the act of Congress in that case made and provided; he having paid fifteen dollars into the treasury of the United States, and otherwise complied with the requirements of the said act.

JAMES RUMSEY.

SEC. VIII. OF DISCLAIMERS.

The 7th section of the law of 3d March, 1837, provides as follows:

“That whenever any patentee shall have, through inadvertence, accident, or mistake, made his specification of claim too broad, claiming more than that of which he was the original or first inventor, some material and substantial part of the thing patented being truly and justly his own, any such patentee, his administrators, executors, and assigns, whether of the whole or of a sectional interest therein, may make disclaimer of such parts of the thing patented as the disclaimant shall not claim to hold by virtue of the patent or assignment, stating therein the extent of his interest in such patent; which disclaimer shall be in writing, attested by one or more witnesses, and recorded in the Patent Office, on payment, by the person disclaiming, in manner as other patent duties are required by law to be paid, of the sum of ten dollars. And such disclaimer shall thereafter be taken and considered as part of the original specification, to the extent of the interest which shall be possessed in the patent or right secured thereby by the disclaimant, and by those claiming by or under him subsequent to the record thereof. But no such disclaimer shall affect any action pending at the time of its being filed, except so far as it may relate to the question of unreasonable neglect or delay in filing the same.”

In case of patents granted before the 15th December, 1836, no disclaimer will be admitted for record until a model and drawings of the invention, as originally patented, verified by oath, shall have been deposited, unless dispensed with by the Commissioner.

FORM OF DISCLAIMER.

To the COMMISSIONER OF PATENTS:

The petition of Eliphalet Nott, of Schenectady, in the county of Schenectady, and State of New York—

RESPECTFULLY REPRESENTS:

That he has, by assignment duly recorded in the Patent Office, become the owner of a right for the several States of Massachusetts, Connecticut, and Rhode Island, to certain improvements in the steam-engine, for which letters patent of the United States were granted to Jacob Perkins, of Boston, in the State of Massachusetts, dated on the first day of March, 1835. That he has reason to believe that, through inadvertence and mistake, the claim made in the specification of said letters patent is too broad, including that of which the said patentee was not the first inventor. Your petitioner, therefore, hereby enters his disclaimer to that part of the claim in the aforementioned specification which is in the following words, to wit: "I also claim the particular manner in which the piston of the above described engine is constructed, so as to insure the close fitting of the packing thereof to the cylinder, as set forth;" which disclaimer is to operate to the extent of the interest in said letters patent vested in your petitioner, who has paid ten dollars into the Treasury of the United States, agreeably to the requirements of the act of Congress in that case made and provided.

ELIPHALET NOTT.

Witness—JOHN PRINCE.

When the disclaimer is made by the original patentee, it must, of course, be so worded as to express that fact.

SEC. IX. OF REISSUES.

When an applicant wishes to cancel an old patent, and to correct a mistake or error which has arisen from inadvertence, he should state this fact in his application, and expressly *surrender* the old patent, which must be transmitted to the Patent Office before a new patent will be issued. And no improvement or alteration, made subsequently to the filing of the application upon which the original patent was granted, can be introduced into a patent upon reissue. Section 13, of the act of July, 1836, enacts: "That, whenever any patent, which has heretofore been granted, or which shall hereafter be granted, shall be inoperative or invalid, by reason of a defective or insufficient description or specification, or by reason of the patentee claiming, in his specification, as his own invention, more than he had or shall have a right to claim as new, if the error has or shall have arisen by inadvertence, accident, or mistake, and without any fraudulent or deceptive intention, it shall be lawful for the Commissioner, upon the surrender to him of such patent, and the payment of the fur-

ther duty of fifteen dollars, to cause a new patent to be issued to the said inventor, for the same invention, for the residue of the period, then unexpired, for which the original patent was granted, in accordance with the patentee's corrected description and specification."

In a reissue the claim is subject to re-examination, and if it shall appear that any part was not original at the time of granting the patent, the reissue will not be granted, unless said part be omitted, or a disclaimer filed in the Patent Office. If nothing can be claimed, the reissue cannot be granted, nor the surrendered patent returned. Where the patent was granted before the 15th of December, 1836, a model and drawings of the invention, as originally patented, verified by oath, must be deposited in the Patent Office before a reissue can be granted, unless dispensed with by the Commissioner; and when the original patent has been lost, before a reissue can be granted the original patent should first be restored, and then surrendered.

In case of the death of an inventor, or of any assignment of the original patent made by him, a similar right vests in his executors, administrators, or assignees; and the patent so reissued, together with the corrected description and specification, have the same effect and operation in law on the trial of all actions thereafter commenced for causes subsequently accruing, as though the same had been originally filed in such corrected form before the issuing of the original patent.

On a surrender several patents may be issued for distinct and separate parts of the invention, upon the payment of thirty dollars for each.

FORM OF SURRENDER OF A PATENT FOR REISSUE.

To the COMMISSIONER OF PATENTS:

The petition of Samuel Morey, of Philadelphia, in the county of Philadelphia, and State of Pennsylvania—

RESPECTFULLY REPRESENTS:

That he did obtain letters patent of the United States for an improvement in the boilers of steam-engines, which letters patent are dated on the first day of March, 1835. That he now believes that the same is inoperative and invalid by reason of a defective specification, which defect has arisen from inadvertence and mistake. He therefore prays that he may be allowed to surrender, and he hereby does surrender, the same, and requests that new letters patent may issue to him, for the same invention, for the residue of the period for which the original patent was granted, under the amended specification herewith presented, he having paid fifteen dollars into the Treasury of the United States, agreeably to the requirements of the act of Congress in that case made and provided.

SAMUEL MOREY.

SEC. X. OF EXTENSIONS.

Section eighteen of the act of 1836 enacts, "That, whenever any patentee of an invention or discovery shall desire an extension of his patent beyond the term of its limitation, he may make application therefor, in writing, to the

Commissioner of the Patent Office, setting forth the grounds therefor; and the Commissioner shall, on the applicant's paying the sum of forty dollars to the credit of the Treasury, as in the case of the original application for a patent, cause to be published in one or more of the principal newspapers in the city of Washington, and in such other paper or papers as he may deem proper, published in the section of the country most interested adversely to the extension of the patent, a notice of such application, and of the time and place when and where the same will be considered, that any person may appear and show cause why the extension should not be granted." The patentee shall furnish a statement in writing, under oath, of the ascertained value of the invention, and of his receipts and expenditures, sufficiently in detail to exhibit a true and faithful account of loss and profit in any manner accruing to him from and by reason of said invention. And if, upon a hearing of the matter, it shall appear to the full and entire satisfaction of the Commissioner, having due regard to the public interest therein, that it is just and proper that the term of a patent should be extended, by reason of the patentee without neglect or fault on his part, having failed to obtain, from the use and sale of his invention, a reasonable remuneration for the time, ingenuity, and expense bestowed upon the same, and the introduction thereof into use, it shall be the duty of the Commissioner to renew and extend the patent, by making a certificate thereon of such extension, for the term of seven years from and after the expiration of the first term; which certificate shall be entered on record in the Patent Office; and thereupon the said patent shall have the same effect in law as though it had been originally granted for the term of twenty-one years, and the benefit of such extension shall accrue to assignees and grantees of the right to use the thing patented to the extent of their respective interests therein: *Provided, however*, That no extension of a patent shall be granted after the expiration of the term for which it was originally issued.

By the first section of the act of May 27, 1848, it is provided "that the power to extend patents, now vested in the board composed of the Secretary of State, Commissioner of Patents, and Solicitor of the Treasury, by the eighteenth section of the act approved July fourth, eighteen hundred and thirty-six, respecting the Patent Office, shall hereafter be vested solely in the Commissioner of Patents; and when an application is made to him for the extension of a patent, according to said eighteenth section, and sixty days' notice given thereof, he shall refer the case to the principal examiner having charge of the class of inventions to which said case belongs, who shall make a full report to said Commissioner of the said case, and particularly whether the invention or improvement secured in the patent was new and patentable when patented; and thereupon the said Commissioner shall grant or refuse the extension of said patent, upon the same principles and rules that have governed said board; but no patent shall be extended for a longer term than seven years."

The following suggestions and rules have been adopted for the benefit of those persons who may hereafter apply for extensions:

The questions which arise on each application for an extension are—

1. Is the invention *novel*?
2. Is it *useful*?
3. Is it *valuable and important* to the public?
4. Has the inventor been *adequately remunerated* for his time and expenses in originating and perfecting it?

5. Has he used due diligence in introducing his invention into general use?

To enable the Commissioner to come to a correct conclusion in regard to the third point of inquiry, the applicant should procure the testimony of persons not interested in the invention, which testimony should be taken under oath.

In regard to the fourth and fifth points of inquiry, in addition to his own oath showing his receipts and expenditures on account of the invention, by which his profit or loss is to be ascertained, the applicant should show, by the testimony of disinterested witnesses on oath, that he has taken all reasonable measures to introduce his invention into general use; and that, without default or neglect on his part, he has failed to obtain from the use and sale of the invention a reasonable remuneration for the time, ingenuity, and expense bestowed on the same, and the introduction thereof into use.

The law now requiring that a notice of sixty days shall be given of each application for extension, it will be necessary for the applicant to file his petition and pay the requisite fee at least three months before his patent expires.

Persons opposing the extension of a patent must file in the Patent Office their reasons, specifically set forth in writing, twenty days before the day of hearing.

In case of opposition by any person to the extension of a patent, both parties may take testimony, each giving reasonable notice to the other of the time and place of taking said testimony, which shall be taken according to the rules prescribed by the Commissioner of Patents in case of interference.

All arguments submitted to the Commissioner must be in writing.

The report of the examiner, now required by law to be made to the undersigned, will, if practicable, be ready fifteen days before the day appointed for the hearing. And, in order that the examiner may have ample time to make his report, the patent, together with all the testimony and arguments, should be filed in the office at least twenty days before the day of hearing.

If the applicant fails to furnish the undersigned with a statement, *in detail*, of his receipts and expenditures, as required by the 18th section of the act approved July 4, 1836, his application must be rejected. His attention, therefore, is particularly called to this point, as many fail to accompany their petitions with any statement of receipts and expenditures.

If a patent has expired before application for extension is made, or if such application is made *within* the sixty days' notice now required by law, the office can afford the inventor no relief. If he desires a *renewal* of his patent, his remedy is to be found only in a special act of Congress.

SEC. XI. OF DESIGNS.

The 3d section of the act of 1842, without repealing or changing the law under which patents have heretofore been granted, enacts: "That any citizen or citizens, or alien or aliens, having resided one year in the United States, and taken the oath of his or their intention to become a citizen or citizens, who by his, her, or their own industry, genius, efforts, and expense, may have invented or produced any new and original design for a manufacture, whether of metal or other material or materials; or any new and original design for the printing of woollen, silk, cotton, or other fabrics; or any new and original design for a bust, statue, or bas relief, or composition in alto and basso relievo; or any new and original impression or ornament, or to be placed on any article of manufacture, the same being formed in marble or other material; or any new and useful pattern, or print, or picture, to be either worked into, or worked on, or printed, or painted, or cast, or otherwise fixed on any article of manufacture; or any new and original shape or configuration of any article of manufacture not known or used by others before his, her, or their invention or production thereof, and prior to the time of his, her, or their application for a

patent therefor, and who shall desire to obtain an exclusive property or right therein to make, use, and sell, and vend the same, or copies of the same, to others, by them to be made, used, and sold, may make application in writing to the Commissioner of Patents expressing such desire, and the Commissioner, on due proceedings had, may grant a patent therefor, as in the case now of application for a patent: *Provided*, That the fee in such cases, which by the now existing laws would be required of the particular applicant, shall be one-half the sum, (*i. e.*, fifteen dollars;) and that the duration of said patent shall be seven years; and that all the regulations and provisions which now apply to the obtaining or protection of patents, not inconsistent with the provisions of this act, shall apply to applications under this section."

It will be perceived from the above that the law extends protection to a new class of objects, and that this is merely *additional* to previous acts.

In making an application to secure a design, the same course of proceedings is required as in applying for an invention. The petition, specification, and oath, executed as prescribed below, must be filed, and the specimen and duplicate drawings deposited. In case of rejection, no part of the fee for designs is refunded.

FORM OF APPLICATION FOR PATENTS FOR DESIGNS.

To the COMMISSIONER OF PATENTS:

The petition of Benjamin West, of the city and county of Philadelphia, and State of Pennsylvania—

RESPECTFULLY REPRESENTS:

That your petitioner has invented or produced [a new and original design for a composition in alto relievo,] which he verily believes has not been known prior to the production thereof by your petitioner. He therefore prays that letters patent of the United States may be granted to him therefor, vesting in him and his legal representatives the exclusive right to the same, upon the terms and conditions expressed in the act of Congress in that case made and provided, he having paid fifteen dollars into the treasury, and complied with the other provisions of the said act.

BENJAMIN WEST.

FORM OF SPECIFICATION.

To all whom it may concern:

Be it known that I, Benjamin West, of the city of Philadelphia, in the county of Philadelphia, and State of Pennsylvania, have invented or produced a new and original design for a composition in alto relievo, and I do hereby declare that the following is a full and exact description of the same. [Here follows a description of the design with reference to the specimen or drawing, the specification to conclude with declaring what the inventor claims, in terms characteristic of the design, &c.]

BENJAMIN WEST.

Witnesses—

NOAH WEBSTER,
NATHANIEL BOWDITCH.

FORM OF OATH.

CITY AND COUNTY OF PHILADELPHIA, }
State of Pennsylvania, } ss.

On this day of , 185 , before the subscriber, a
 personally appeared the within-named Benjamin West, and made solemn oath
 [or affirmation, as the case may be] that he verily believes himself to be the
 original and first inventor or producer of the design for a composition in alto-
 relievo, and that he does not know or believe that the same was ever before
 known or used; and that he is a citizen of the United States.

Signed,

B. A.

SEC. XII. OF FOREIGN PATENTS.

A patent may be taken out by the inventor in a foreign country without affecting his right to a patent in the United States, provided the invention has not been introduced into public and common use in the United States prior to the application. In every such case the patent is limited to fourteen years from the date of the foreign letters patent. The introducer, *as such*, of a new invention from a foreign country is not entitled to letters patent. If an alien neglects to put and continue on public sale the invention in the United States, on reasonable terms, for eighteen months, he loses all the benefit of the patent.

Applications for inventions *patented* in a foreign country will be taken up for examination immediately after all the necessary papers and drawings have been filed, the fee paid, and the model deposited. As the letters patent issued in this country for inventions patented abroad bear date with the foreign letters patent, this rule has been adopted with the view of giving the longest term to the patent in this country. No invention will be considered as patented in a foreign country unless the specification has been enrolled, and the patent in all respects complete.

For a similar reason, applications for the surrender and reissue of letters patent, and for additional improvements to be added to original letters patent, will be examined immediately after they shall have been completed.

SEC. XIII. OF CAVEATS.

The 12th section of the act of 1836 provides: "That any citizen of the United States, or alien who shall have been a resident of the United States one year next preceding, and shall have made oath of his intention to become a citizen thereof, who shall have invented any new art, machine, or improvement thereof, and shall desire further time to mature the same, may, on paying to the credit of the treasury the sum of twenty dollars, file in the Patent Office a caveat, setting forth the design and purpose thereof, and its principal and distinguishing characteristics, and praying protection of his rights till he shall have matured his invention; which sum of twenty dollars, in case the person filing such caveat shall afterwards take out a patent for the invention therein mentioned, shall be considered a part of the sum herein required for the same. And such caveat shall be filed in the confidential archives of the office,

and preserved in secrecy. And if application shall be made by any other person, within one year from the time of filing such caveat, for a patent of any invention with which it may in any respect interfere, it shall be the duty of the Commissioner to deposit the description, specifications, drawings, and model in the confidential archives of the office, and to give notice (by mail) to the person filing the caveat of such application, who shall, within three months after receiving the notice, if he would avail himself of the benefit of his caveat, file his description, specifications, drawings, and models; and if, in the opinion of the Commissioner, the specifications of claim interfere with each other, like proceedings may be had in all respects as are in this act provided in the case of interfering applications.

"Whenever the applicant shall request it, the patent shall take date from the time of filing the specification and drawings, not, however, exceeding six months prior to the actual issuing of the patent; and, on like request, and the payment of the duty herein required, by any applicant, his specification and drawings shall be filed in the secret archives of the office until he shall furnish the model, and the patent be issued, not exceeding the term of one year; the applicant being entitled to notice of interfering applications."

Caveats may be renewed yearly by payment of a new fee of \$20; but the protection afforded by a caveat is against only such applications as are filed within the year from the time of filing the caveat.

A full description of the invention is required to enable the Commissioner of Patents to judge of interferences.

The law makes no provision for the filing of caveats by *foreigners*.

For the information of caveators, the following rules have been adopted:

1. Caveat papers cannot, under *any circumstances*, be withdrawn from the office, nor undergo any alteration, after they have been once filed; nor can *any* information concerning them be communicated to *any person, at any time*, without the consent of the caveators in writing.

2. Additional papers relating to *the invention* may be admitted under the same file, the date of reception of such papers being noted.

3. In case of filing papers additional to an original caveat, the right to notice of such papers expires with the caveat; and any additional papers, not relating to the invention as first caveated, are not entitled to notice.

4. Caveat papers once filed cannot be inspected by the caveator, except in presence of a sworn officer, nor by any other persons than those duly authorized by law to examine such papers; nor can any information touching them be communicated to third parties without the consent of the caveator in writing.

5. The caveator, or other person properly authorized by him, may at any time obtain copies of the caveat papers at the usual rates.

6. It is desirable that caveats should be explicit as to the character and features of the invention, embrace suitable drawings or sketches, and a model if convenient. The caveat fails of its purpose when the invention is not sufficiently explained.

FORM OF CAVEAT.

To the COMMISSIONER OF PATENTS:

The petition of Amos Whittemore, of the city and-county of New York, and State of New York—

RESPECTFULLY REPRESENTS:

That he has made certain improvements in the machine for making wool cards, and that he is now engaged in making experiments for the purpose of

perfecting the same, preparatory to his applying for letters patent therefor. He therefore prays that the subjoined description of his invention may be filed as a CAVEAT, in the confidential archives of the Patent Office, agreeably to the provisions of the act of Congress in that case made and provided; he having paid twenty dollars into the treasury of the United States, and otherwise complied with the requirements of the said act.

AMOS WHITTEMORE.

NEW YORK, *July 16, 1849.*

Here should follow a description of the general principles of the invention, so far as it has been completed.

SEC. XIV. OF THE DURATION OF PATENTS, AND THE PENALTY FOR ILLEGALLY STAMPING ARTICLES.

The term for which a regular patent is granted is *fourteen years*; but it may, under certain circumstances, be extended for seven years, as herein before mentioned. Patents for designs are granted for *seven years* only.

Stamping or affixing the name of any patentee on any article without authority so to do, or affixing the word *patent*, or *letters patent*, or the stamp, mark, or device of any patentee, on any unpatented article, is forbidden under a penalty of not less than one hundred dollars.

Patentees or their assignees are required to affix the date of the patent on each article vended or offered for sale, under a like penalty; thus affording to the public notice of the duration of the patent. When the article is of such a nature that the name of the patentee cannot be printed thereon, it should be affixed to the case or package containing it.

SEC. XV. OF THE REPAYMENT OF MONEY DEPOSITED BY MISTAKE.

The first section of the act of 1842 authorizes the Treasurer of the United States to pay back any money which has been paid into the treasury by actual mistake, as for patent fees, thus precluding the necessity of special application to Congress for relief, and is in the following words: That "the Treasurer of the United States be, and he hereby is, authorized to pay back, out of the patent fund, any sum or sums of money, to any receiver or depository, to the credit of the Treasurer, as for fees accruing at the Patent Office through mistake, and which are not provided to be paid by existing laws, certificate thereof being made to said Treasurer by the Commissioner of Patents."

SEC. XVI. OF GRANTING ANEW LOST PATENTS, AND SUCH AS WERE DESTROYED BY THE FIRE OF 1836.

The third section of the act of March 3, 1837, provides: "That whenever it shall appear to the Commissioner that any patent was destroyed by the burning of the Patent Office building on the aforesaid fifteenth day of December, or was otherwise lost prior thereto, it shall be his duty, on application therefor by

the patentee, or other person interested therein, to issue a new patent for the same invention or discovery, bearing the date of the original patent, with his certificate thereon, that it was made and issued pursuant to the provisions of the third section of this act; and shall enter the same of record: *Provided, however,* That, before such patent shall be issued, the applicant therefor shall deposit in the Patent Office a duplicate, as near as may be, of the original model, drawings, and description, with specification of the invention or discovery, verified by oath, as shall be required by the Commissioner; and such patent and copies of such drawings and descriptions, duly certified, shall be admissible as evidence in any judicial court of the United States, and shall protect the rights of the patentee, his administrators, heirs, and assigns, to the extent only in which they would have been protected by the original patent and specification."

The privilege of renewal of lost patents is now extended to those *granted* before the fire of December, 1836. Formerly, it was limited to those actually *lost* before the fire, thus excluding many lost subsequently, and before they were recorded anew in this office, leaving the inventor without remedy.

FORM OF OATH ON RESTORING DRAWINGS, OR SKETCHES FROM WHICH
DRAWINGS MAY BE MADE, TO REPLACE THE ORIGINALS DESTROYED
IN THE OFFICE.

CITY AND COUNTY OF NEW YORK, }
State of New York, } ss.

On the first day of March, 1838, before the subscriber, a , personally appeared Robert Fulton, of the city of New York, and made solemn oath that he is the inventor [*or is interested in the invention as administrator, &c.*] of an improved mode , for which letters patent of the United States were granted to him, dated the day of ; and the annexed drawing [*or sketch*] is, as he verily believes, a true delineation of the invention described in the said letters patent.
A. B.

N. B. *Patentees*, and the public in general, are urged to use their influence to aid the office in restoring the records of all patents and assignments on record before the fire in December, 1836. The same cannot be used in evidence unless *so recorded anew*. No expense is incurred. The papers are received and transmitted by mail free of postage.

SEC. XVII. OF ASSIGNMENTS.

An inventor can assign his entire right before a patent is obtained, so as to enable the assignee to take out a patent in his own name; but the assignment must be first entered of record, and the application therefor must be duly made, and the specification signed and sworn to by the inventor. In the case of an assignment by a foreigner, the same fee will be required as if the patent issued to the inventor.

The assignment of a patent may be of the whole or of an undivided part, "by any instrument in writing." All assignments, and also the grant or conveyance of the use of the patent in any town, county, State, or specified dis-

trict, must be recorded in the Patent Office within three months from the date of the same. But assignments, if recorded after three months have expired, will be on record as notice to protect against subsequent purchasers. Grants and assignments, recorded prior to the 15th December, 1836, must be recorded anew before they can be valid as evidence of any title.

In all cases in which the entire invention has been assigned before the issue of the patent, the correspondence should be in the name of the assignee, he being the party in interest.

By the act of May 27, 1848, the Commissioner of Patents is directed to charge fees for recording assignments, powers of attorney, licenses, &c., at the following rates, viz :

On all assignments, &c., which shall not contain over 300 words	-	\$1 00
On all assignments, &c., containing more than 300 words, and not more than 1,000 words	- - - - -	2 00
On all assignments, &c., containing more than 1,000 words	- - - - -	3 00

Which fees are, in all cases, *to be paid in advance, in specie.*

The receipt of assignments is never acknowledged by the office, but they are generally recorded in their turn, and transmitted to the persons entitled to them.

FORM OF ASSIGNMENT OF AN ENTIRE INVENTION, BEFORE OBTAINING LETTERS PATENT, AND TO BE RECORDED PREPARATORY THERETO.

Whereas I, Jethro Wood, of Scipio, in the county of Cayuga, and State of New York, have invented certain new and useful improvements in ploughs, for which I am about to make application for letters patent of the United States; and whereas David Peacock, of Burlington, New Jersey, has agreed to purchase from me all the right, title, and interest which I have, or may have, in and to the said invention, in consequence of the grant of letters patent therefor, and has paid to me, the said Wood, the sum of five thousand dollars, the receipt of which is hereby acknowledged: Now, this indenture witnesseth, that, for and in consideration of the said sum to me paid, I have assigned and transferred, and do hereby assign and transfer, to the said David Peacock, the full and exclusive right to all the improvements made by me, as fully set forth and described in the specification which I have prepared and executed, preparatory to the obtaining of letters patent therefor. And I do hereby authorize and request the Commissioner of Patents to issue the said letters patent to the said David Peacock, as the assignee of my whole right and title thereto, for the sole use and behoof of the said David Peacock and his legal representatives.

In testimony whereof I have hereunto set my hand and affixed my seal, this sixteenth day of July, 1849.

JETHRO WOOD. [L. s.]

Sealed and delivered in the presence of—

GEORGE CLYMER,
DAVID RITTENHOUSE.

FORM OF ASSIGNMENT OF A PARTIAL RIGHT IN A PATENT.

Whereas I, Jethro Wood, of Scipio, in the county of Cayuga, and State of New York, did obtain letters patent of the United States for certain improve-

ments in ploughs, which letters patent bear date the first day of March, 1838; and whereas, David Peacock, of Burlington, New Jersey, is desirous of acquiring an interest therein: Now, this indenture witnesseth, that, for and in consideration of the sum of two thousand dollars, to me in hand paid, the receipt of which is hereby acknowledged, I have assigned, sold, and set over, and do hereby assign, sell, and set over, unto the said David Peacock, all the right, title, and interest which I have in the said invention, as secured to me by said letters patent, for, to, and in the several States of New York, New Jersey, and Pennsylvania, and in no other place or places. The same to be held and enjoyed by the said David Peacock, for his own use and behoof, and for the use and behoof of his legal representatives, to the full end of the term for which said letters patent are or may be granted, as fully and entirely as the same would have been held and enjoyed by me had this assignment and sale not been made.

In testimony whereof I hereunto set my hand and affix my seal, this sixteenth day of July, 1849.

JETHRO WOOD. [L. s.]

Sealed and delivered in the presence of—

JACOB PERKINS,
BENJAMIN FRANKLIN.

SEC. XVIII. OF THE FEES—HOW PAYABLE.

All fees must be paid in SPECIE, and in advance, except those required for drawings and copies, the expense of which will be communicated on application for the same.

Every applicant, on presenting his petition or application, must pay into the treasury of the United States, or into the Patent Office, or to any of the Assistant treasurers, treasurers of the mint and branch mints, collectors and surveyors of customs, and receivers of public money, particularly named below, a deposite to the credit of the Treasurer, as follows:

If a citizen of the United States, as a patent fee	-	-	-	\$30 00
If a foreigner, who has resided in the United States one year next preceding the application for a patent, and shall have made oath of his intention to become a citizen	-	-	-	30 00
If a subject of the sovereign of Great Britain	-	-	-	500 00
All other foreigners	-	-	-	300 00
On entering a caveat	-	-	-	20 00
On entering an application for an appeal from the decision of the Commissioner	-	-	-	25 00
On extending the patent beyond the fourteen years	-	-	-	40 00
For adding to a patent the specification of a subsequent improvement	-	-	-	15 00
In case of reissues, for every additional patent	-	-	-	30 00
On surrender of an old patent, to be reissued to correct a mistake of the patentee	-	-	-	15 00
On application for a design	-	-	-	15 00
For a disclaimer	-	-	-	10 00
For copies of patents, or any other paper on file, for each 100 words	-	-	-	10
An all assignments, &c., which shall not contain over 300 words	-	-	-	1 00
On all assignments, &c., containing more than 300 and not more than 1,000 words	-	-	-	2 00
On all assignments, &c., containing more than 1,000 words	-	-	-	3 00

For copies of drawings a reasonable sum, in proportion to the time occupied in making the same.

Money is frequently lost, owing to an incautious method of securing it to the letter. Fees, when sent direct to the Commissioner in specie, should therefore be firmly attached to the letter, to avoid the danger of loss from becoming loose and wearing through the envelope.

It is recommended to make a deposit with an assistant treasurer, or other officer authorized to receive public moneys, of the fee for a patent or other application, and to remit the certificate. Where this cannot be done without much inconvenience, gold may be remitted by mail at the risk of the applicant.

In case of deposit made with the assistant treasurers, or other persons authorized to receive public moneys, a *duplicate receipt* should be taken, stating by whom the payment was made, and for what object. The particular invention should be referred to, to enable the applicant to recover back the twenty dollars in case of the withdrawal of the petition. The certificate of deposit may be made in the following form :

Office of the

The Treasurer of the United States has credit at this office for _____ dollars in specie, deposited by _____, of the town of _____, in the county of _____, and State of _____, the same being for a patent [*or whatever the object may be*] for a steam-boiler.

A. B.

Officers who are authorized to receive patent fees on account of the Treasury of the United States, and to give receipts or certificates of deposit therefor, viz :

Assistant Treasurer of the United States, Boston, Massachusetts.
 Assistant Treasurer of the United States, New York, New York.
 Treasurer of the Mint, Philadelphia, Pennsylvania.
 Surveyor and Inspector, Pittsburg, Pennsylvania.
 Assistant Treasurer of the United States, Charleston, South Carolina.
 Collector, Baltimore, Maryland.
 Collector, Richmond, Virginia.
 Collector, Norfolk, Virginia.
 Collector, Buffalo Creek, New York.
 Collector, Wilmington, North Carolina.
 Collector, Savannah, Georgia.
 Collector, Mobile, Alabama.
 Treasurer, Branch Mint, New Orleans, Louisiana.
 Assistant Treasurer of the United States, St. Louis, Missouri.
 Surveyor of the Customs, Nashville, Tennessee.
 Surveyor of the Customs, Cincinnati, Ohio.
 Receiver of Public Moneys, Little Rock, Arkansas.
 Receiver of Public Moneys, Jeffersonville, Indiana.
 Receiver of Public Moneys, Chicago, Illinois.
 Receiver of Public Moneys, Detroit, Michigan.
 Collector, San Francisco, California,
 Depository, Tallahassee, Florida.

Any person wishing to pay a patent or other fee may deposite it with either of the officers above named, and forward the receipt or certificate to this office as evidence thereof.

Money sent by mail is at the risk of the person sending the same. And all money sent from the office by mail is at the risk of the person requesting to have it transmitted in that way. In no case should money be sent enclosed with models.

SEC. XIX. OF PATENT AGENTS.

There is, in this and other cities, a class of persons denominated "Patent Agents" or "Patent Attorneys," whose occupation is to offer advice and render assistance to individuals having business with the office. From certain information which has come to the knowledge of the Commissioner, it is deemed necessary to observe, that, whatever may be said to the contrary, no greater facilities are extended to them than to the inventor who makes his own application. The rules and regulations contained in this pamphlet are as much for their guidance as for the direction of the applicant himself, and as strict a compliance with them is required of one as of the other. Personal influence avails neither. Patents are granted or rejected upon the merits of the cases presented, and there are no circumstances which can, with the knowledge of the undersigned, be brought to bear to turn the office from the strictest impartiality.

To relieve applicants from the expense of employing agents, the examiners will decide questions of novelty and patentability upon papers imperfectly prepared, if sufficiently perspicuous to be understood, *when such papers are prepared by the inventor himself*. But, if an agent be employed, it is presumed that he is qualified for the business he has undertaken without calling on the office for instructions.

Inventors desirous of examining models before making application, should apply to the Commissioner or chief clerk, who will direct the machinist to aid them in all necessary inquiries. This caution is given to save applicants from impositions to which they are exposed. If the services of Patent Agents are desired, able and faithful ones can be found *at their offices* in this and other cities.

Patent Agents who have filed a full power of attorney, authorizing them to receive letters patent for the patentees, will be allowed to take them from the office; after which they cannot be returned, with the view to be transmitted to the inventor under the frank of the Commissioner. If agents retain the patents of their clients in their possession after they have been issued, it is a private matter between the patentee and his attorney, with which the office has nothing to do.

It is hardly necessary to state that no fees are received in this office except those provided for by law, and that no offers of sums of money, or payment of the same to third parties, can influence the decision upon a case, or hasten the period of its examination.

SEC. XX. OF CORRESPONDENCE.

In answer to an inquiry addressed to the First Assistant Postmaster General, touching mailable matter, the following letter has been received :

"POST OFFICE DEPARTMENT, CONTRACT OFFICE,
August 30, 1849.

"To THOS. EWBank, Esq., *Commissioner of Patents* :

"SIR : I hasten to say, in answer to your inquiry of to-day, that what may be sent by mail is specified by acts of Congress to be letters, letters enclosing money, newspapers, magazines, pamphlets, and all other written or printed matter whereof each copy or number shall not exceed eight ounces, packages thereof not exceeding three pounds in weight ; public documents, printed by order of either House of Congress ; and books and documents interchanged between the Executives of States. *Neither models of machines, nor the substances of which they are usually composed, wood, glass, tin, or other metals, are entitled, by law or regulation, to transmission in the mail ;* and the mailing and forwarding of them will be refused in every instance where the required care is taken at the post office to exclude unmailable matter.

"Respectfully, your obedient servant,

"S. R. HOBBIE,

"*First Assistant Postmaster General.*"

All communications relating to official transactions should be addressed to the Commissioner of Patents ; no other can receive attention ; and it must not be regarded as discourteous if private letters to employees in office are returned without reply ; nor must correspondents complain, even if their letters are properly addressed to the Commissioner, if their business receives no attention from the office, when their *signatures are so illegibly written* as to render it impossible to decipher them, or when the *post office* and State (or either of them) are omitted in their address.

No double correspondence can be sanctioned. When an inventor employs an agent, the office will correspond with either, but not with both.

This remark is necessary, from the numerous letters received from applicants asking for information of what their attorneys have done, and often protesting against their acts.

Telegraphic communications, if not received before 3 p. m., cannot be answered till the following day ; the greater part arrive after the office has been closed. Moreover, *signatures* are sometimes so illegibly written that telegraphic operators misinterpret them, and the office is consequently at a loss properly to translate them.

SEC. XXI. PATENT OFFICE REPORTS.

These are generally submitted to Congress in January, and comprehend the transactions of the office during the preceding year ; but, from causes over which this bureau has no control, they are seldom printed until the current year has nearly expired. In the mean time letters are constantly being received from citizens of every profession and section of the Union, asking for copies, under the mistaken idea that their distribution is under the control of

the office. So far from this being the fact, a very limited number only is placed by Congress at its disposal, *e. g.* of the Report for 1847, ONE HUNDRED AND THIRTY FIVE THOUSAND COPIES were printed, of which THREE THOUSAND were appropriated to the Patent Office. The remaining 132,000 were subject to the orders and disposal of members of Congress. Of the Report for 1848 SEVENTY-FIVE THOUSAND were ordered; of these, TWENTY-FIVE HUNDRED were sent to this bureau, and of them ONLY FIVE HUNDRED had the *list of patents and claims* annexed.

It will be perceived that the office does not receive HALF the number inventors and patentees call for; and, as far as possible, it is deemed right first to supply them. Persons, therefore, desiring Reports, should distinctly state the grounds upon which their requests are preferred. If it shall appear that they have contributed to the support of the office by the payment of fees, or to the information contained in the Agricultural Report, their names will be entered upon a list kept for that purpose, and when the document is ready for distribution copies will be sent to their address in the order of their applications.

With few exceptions, the office is compelled to refer other citizens to the members of Congress from their districts.

THOMAS EWBANK,
Commissioner of Patents.

PATENT OFFICE, *October 11, 1851.*

REQUEST.

Congress having authorized the collection and distribution of seeds through this office, a transmission to this place of any rare and useful seeds may confer a great benefit on the community, and will, so far as practicable, be reciprocated by the Commissioner. A history of the seed transmitted, together with the place of production, is respectfully solicited.

NOTE ON PIN-MAKING.

BY THE LATE WILLIAM SERRELL, OF NEW YORK.

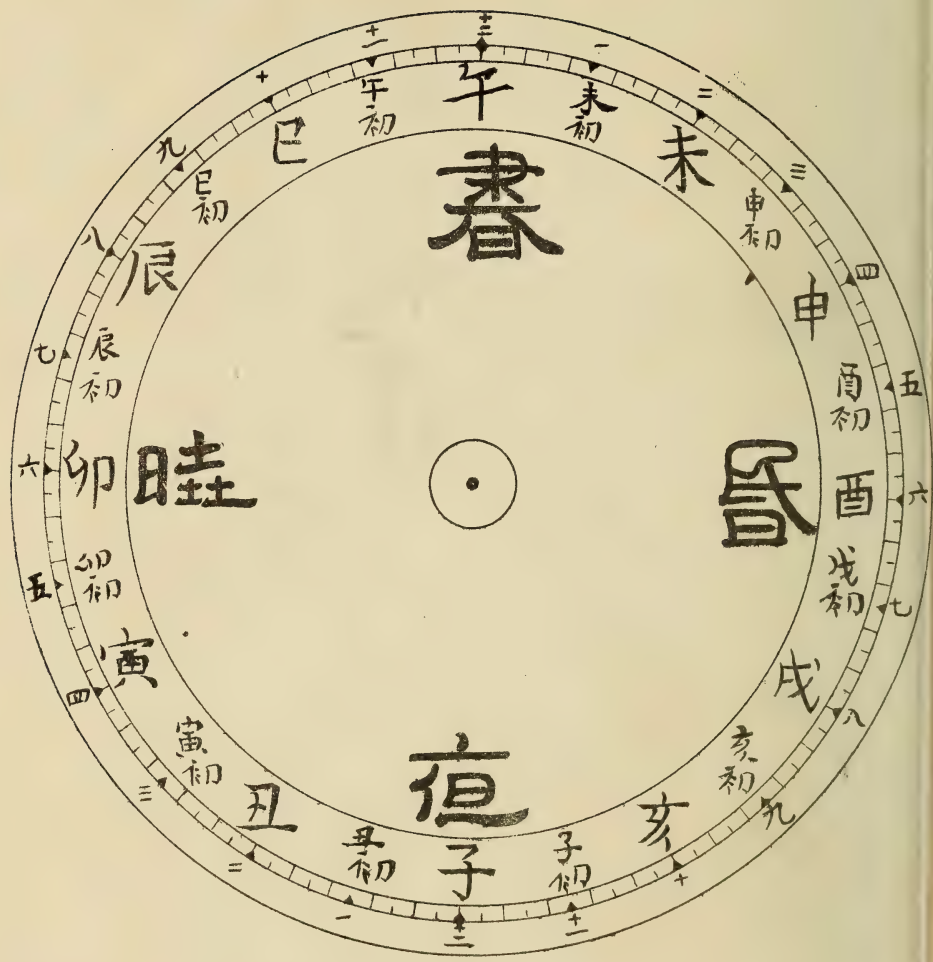
In page 413, article "Pin Manufacture," of the Report of 1850, there are a few errors. Lemuel *Wellman* Wright (not William) was a native of Haverhill, New Hampshire, and a descendant of Mrs. Dustin, of historic notoriety by the slaughter of Indians to whom she was a prisoner, and by which she saved her life. Mr. Wright made his pin-machine between 1820 and 1824, and his specification will be found in Newton's Journal, vol. 9, 1825, page 281. The machinery was built as stated, and in use in 1826. It fed the wire from the reel, straightened and cut it, pointed the shank at two operations, headed it at two more movements—the last delivering the complete pin. The writer has many times turned out sixty pins, an inch long, per minute, by one hand.

The difficulty in pointing arose from the fact, that after D. F. Taylor and Wright separated, no workmen, *not* trained by Wright, could be found to make and adjust, and keep in order, the rotatory files that formed the points. Of all this the writer was personally cognizant up to 1830; but since that time has had no direct knowledge.

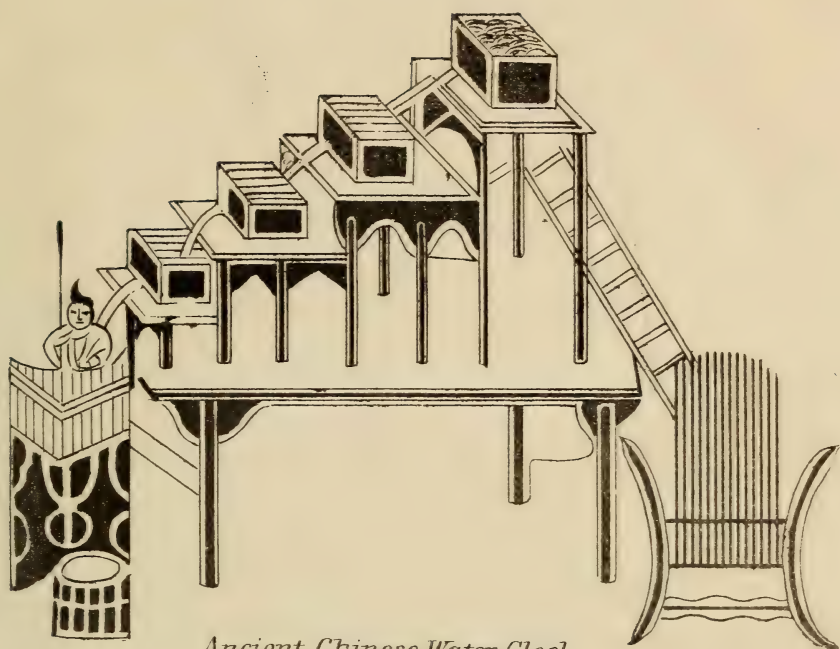
About 1825 or 1826, a set of these machines was sent to this country, to be worked under the American patent of 1825. The workman who was to have charge of them was delayed to bring the tools for repairing them, and for building others; but when he arrived, from some cause or other, he found every machine broken, so that he could not repair them. What has become of them is not known.

Mr. Wright was recently living at Chalford, England; and a history of his inventions, and the difficulties he has gone through, would fill a small volume. It is understood he has done best with his machinery for bleaching woven cotton and linen goods. He is now aged about sixty-three, but still active in the field of invention.

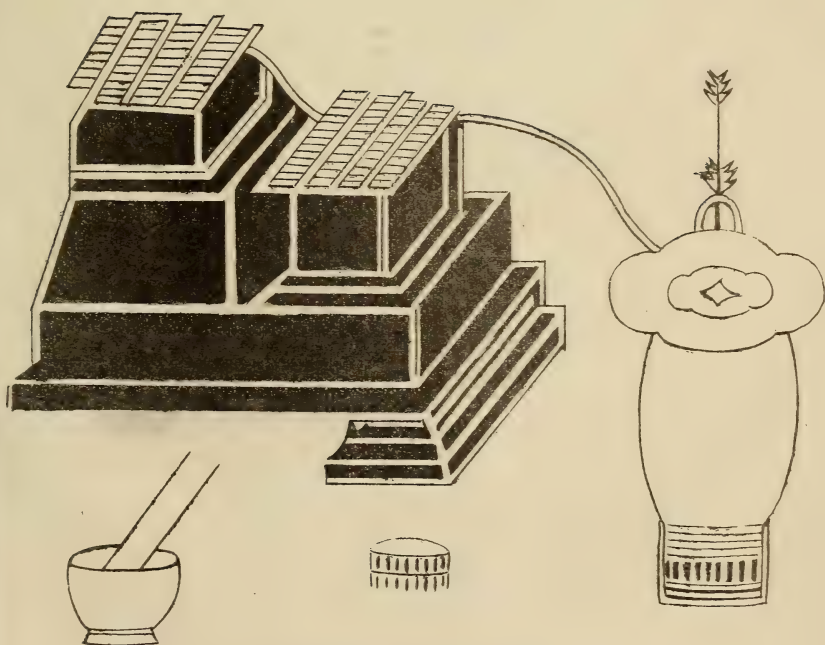




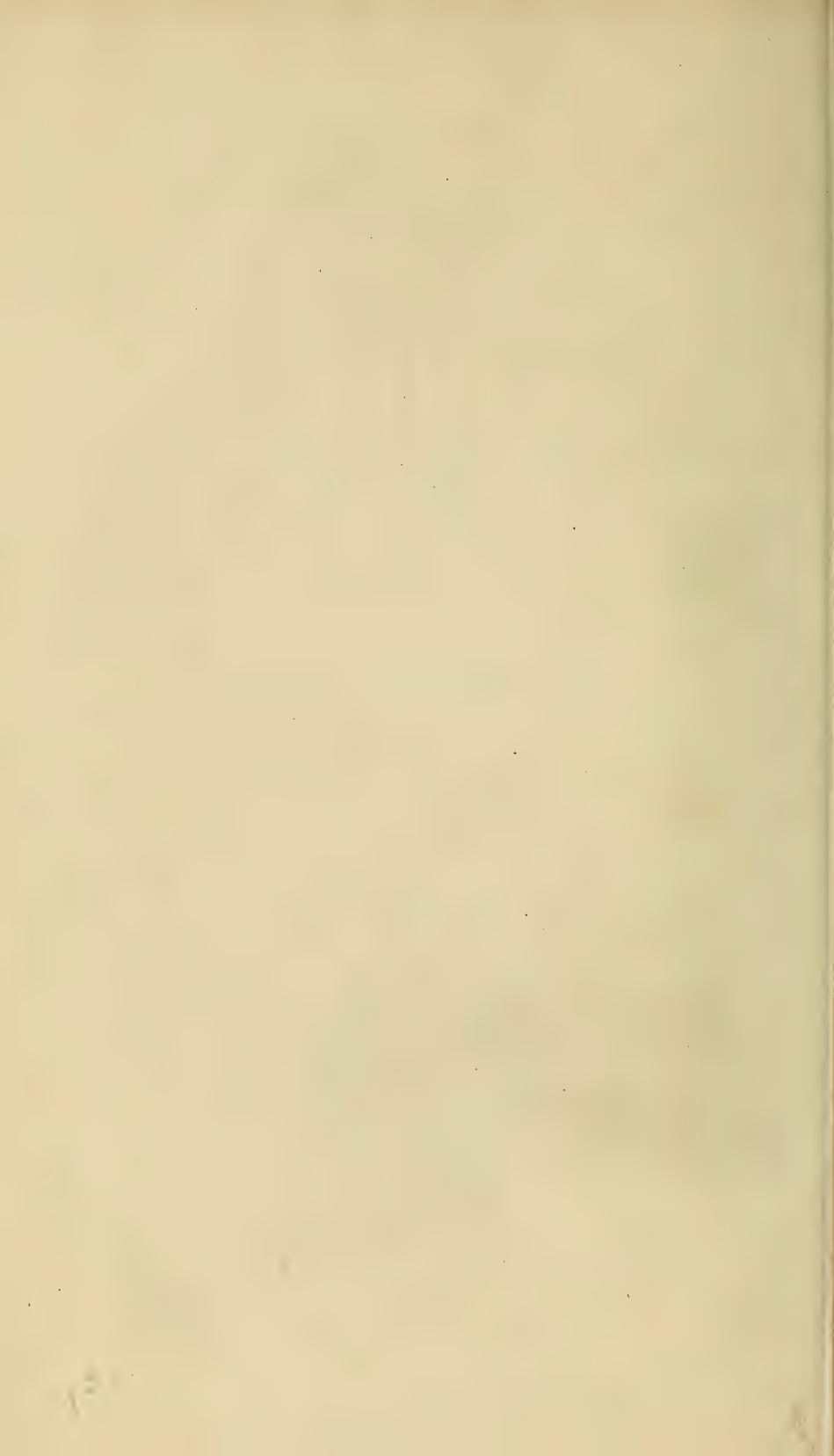
Dial Plate of Clock for the Chinese Market



Ancient Chinese Water Clock



Ancient Chinese Water Clock





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